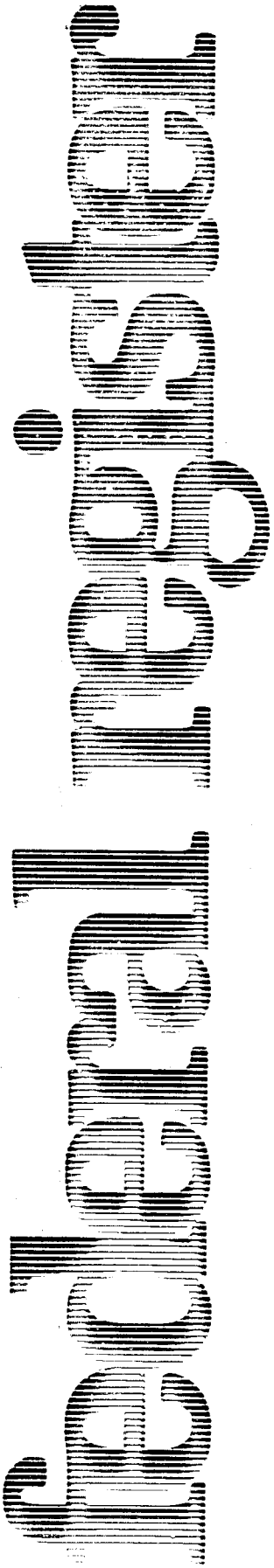

Wednesday
February 25, 1987

Part II

Environmental Protection Agency

40 CFR Part 763

Asbestos Abatement Projects; Worker Protection; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 763

[OPTS-62050; FRL 3104-1]

Asbestos Abatement Projects; Worker Protection

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This rule, under section 6(a) of the Toxic Substances Control Act (TSCA), 15 U.S.C. 2605(a), extends additional protections to State and local government employees covered by the EPA asbestos abatement worker protection rule published in the **Federal Register** of April 25, 1986. This additional protection is provided by incorporating in the EPA rule the new asbestos workplace standard issued by the Occupational Safety and Health Administration (OSHA) in June 1986. EPA's worker protection rule of April 1986 had extended the protection of OSHA's previous asbestos workplace standard to employees in States that do not have either worker protection plans approved by OSHA or asbestos abatement regulations which EPA decided were comparable to or more stringent than EPA's worker protection rule.

DATES: In accordance with 40 CFR 23.5 (50 FR 7271), this rule shall be promulgated for purposes of judicial review at 1 p.m. eastern time on March 11, 1987. This rule is effective on March 27, 1987.

FOR FURTHER INFORMATION CONTACT: Edward A. Klein, Director, TSCA Assistance Office (TS-799), Office of Toxic Substances, Environmental Protection Agency, Rm. E-543, 401 M St. SW., Washington, DC 20460, (202-554-1404).

SUPPLEMENTARY INFORMATION:

I. Authority

Section 6(a) of TSCA authorizes EPA to impose a number of specific regulatory requirements concerning a chemical substance or mixture if the Agency finds that the manufacturing, processing, distribution in commerce, use, or disposal of the substance or mixture, or any combination of these activities presents or will present an unreasonable risk of injury to health or the environment. Among the requirements that EPA may impose are those in section 6(a) (5) and (6). Section 6(a)(5) of TSCA authorizes EPA to prohibit or otherwise regulate any manner or method of commercial use of a chemical substance or mixture. Section 6(a)(6) of TSCA authorizes EPA to prohibit or otherwise regulate any manner or method of disposal of a chemical substance or mixture, or any article containing that substance or mixture, by any person who uses or disposes of it for commercial purposes.

These subsections provide authority for EPA to issue this rule, which establishes requirements to protect State and local public employees engaged in abating the hazards of asbestos in public buildings. The asbestos present in such buildings has been sold as a commercial product, and therefore abatement activities affecting the use of asbestos in these buildings is commercial activity, subject to section 6(a)(5) of TSCA. The removal of asbestos, a disposal activity, will affect commercial activities occurring in the public buildings, and, therefore, is considered disposal for commercial purposes subject to section 6(a)(6).

II. Background

This rule replaces a final rule published in the **Federal Register** of April 25, 1986 (51 FR 15722). That rule was promulgated after EPA received and considered public comments on an immediately effective proposed rule published in the **Federal Register** of July 12, 1985 (50 FR 28530). In the previous final rule, EPA extended provisions of the then existing Asbestos Standard of the Occupational Safety and Health Administration (OSHA) to State and local government employees who were not covered by asbestos standards issued under State plans approved by OSHA, or other State regulations in Idaho, Kansas, Oklahoma, and Wisconsin that EPA had determined are comparable to or more stringent than the EPA rule. In that rule EPA announced that it would issue a revised rule when the OSHA standard was revised to ensure that all public and private sector employees who participate in asbestos abatement projects enjoy similar levels of protection. OSHA issued such a revised rule with detailed requirements for construction activities, including asbestos abatement projects, in the **Federal Register** of June 20, 1986 (51 FR 22612).

EPA also announced in the previous rule that it would issue the revised rule as a final rule with no additional comment period because EPA and OSHA had already received extensive comments on the topic of protection of workers engaged in abatement work (51 FR 15723). EPA is incorporating changes in this rule which have been suggested in comments to both agencies. In this rule, EPA is lowering the permissible exposure limit (PEL) to asbestos to 0.2 fiber per cubic centimeter of air (f/cc) and is instituting new requirements for engineering and work practice controls, and new requirements to train workers engaged in asbestos abatement.

III. The Relationship of This Rule to the OSHA Asbestos Standard

In general, this rule applies the major provisions of OSHA's new Asbestos Standard for construction work to asbestos abatement projects. This rule, however, differs from OSHA's because it retains certain features of EPA's previous final rule. It applies solely to activities involved in asbestos abatement projects, in contrast to the standard promulgated by OSHA, which applies generally to any construction activity involving exposure to asbestos. This rule also retains the definition of asbestos EPA has used in the previous final rule and, unlike OSHA's standard, does not cover non-asbestiform fibers.

This rule also differs from OSHA in retaining the reporting requirements published in the previous final EPA rule. EPA considers these requirements necessary to monitor compliance with the general provisions of the rule. Under § 763.124, employers, with certain exceptions, must notify EPA that they intend to undertake an abatement project covered by the rule at least 10 days before they begin abatement. The exceptions include all asbestos abatement projects involving less than 3 linear feet or 3 square feet of friable asbestos material, which employers need not report to EPA, and emergency projects which need not be reported in advance, but, instead, "as soon as possible but in no case more than 48 hours after the project begins."

Employers engaged in small-scale abatement projects should note that this rule imposes requirements which differ from those in the previous final rule. These requirements differ because EPA is incorporating OSHA's new provisions for small-scale, short-duration projects. Thus, under the new rule, employers whose workers are engaged in sampling or repair projects of less than 3 linear feet or 3 square feet are no longer excluded from all requirements as they were in EPA's previous final rule. Instead, consistent with OSHA, the new rule defines "small-scale", "short duration" projects in a qualitative way and generally imposes requirements different from, and less burdensome than, projects characterized as large-scale and long-duration (see Units V.C and G). Examples of typical small-scale,

short-duration pr
V.C.

EPA also wish
why it defines th
same way as OS
"particulate forn
micrometers or
diameter ratio c
definition is cor
avoids technica
measuring conc
fibers. The defi
from a finding
harmful than o
readers to its p
fiber length in
published in th
January 29, 19
Proposed Min
Restrictions a
Manufacturin
Processing Pr
an analysis o

IV. Provision

EPA has r
763.124, 763.
language cor
rule, reportir
enforcement
rule publish
sections are
the conveni
763.121 of th
regulatory
protection
abatement
replace the
published i
provisions
763.122 of
criteria for
this rule a
submissio
regulatior
request e
procedure
This doc
authority
This ru
EPA is n
relatively
for asbe
public s
same tir
permiss
practice
require
constru

A. Exp

In th
Permis
worke
In § 76
fiber p
avera
(defin
depar

short-duration projects are listed in Unit V.C.

EPA also wishes to clarify the reasons why it defines the term "fiber" in the same way as OSHA, i.e., as a "particulate form of asbestos 5 micrometers or longer, with a length to diameter ratio of at least 3 to 1." This definition is consistent with OSHA and avoids technical difficulties in measuring concentrations of smaller fibers. The definition does not result from a finding that small fibers are less harmful than other fibers. EPA refers readers to its previous discussion of fiber length in the preamble to the notice published in the **Federal Register** of January 29, 1986 entitled "Asbestos; Proposed Mining and Import Restrictions and Proposed Manufacturing, Importation and Processing Prohibitions" (51 FR 3742) for an analysis of this issue.

IV. Provisions

EPA has retained in §§ 763.120, 763.124, 763.125, and 763.126 the same language concerning the scope of the rule, reporting requirements, enforcement and inspections as in the rule published in April 1986. Those sections are republished in this rule for the convenience of the reader. Section 763.121 of this rule establishes new regulatory requirements for the protection of State and local asbestos abatement workers. These requirements replace the requirements of the rule published in April 1986. The major new provisions are discussed below. Section 763.122 of this rule establishes the criteria for States to be excluded from this rule and the procedures for the submission and review of the regulations adopted by States which request exclusion. These criteria and procedures are summarized in Unit V. This document also corrects the authority citation for 40 CFR Part 763.

This rule is effective March 27, 1987. EPA is making this rule effective at this relatively early date so that protections for asbestos abatement workers in the public sector will be introduced at the same time as, or soon after, the lower permissible exposure level, work practices and engineering controls required by OSHA's standard for the construction industry.

A. Exposure Limits

In this rule, EPA establishes a new Permissible Exposure Limit (PEL) for workers exposed to airborne asbestos. In § 763.121(c), it sets the PEL as 0.2 fiber per cubic centimeter of air (f/cc), averaged over an 8-hour day. Employers (defined in this rule as the public department, agency or entity which hires an employee) must determine the PEL by means of the methods prescribed in Appendix A, the "EPA/OSHA Reference Method," or by an equivalent method, as described in Appendix B, "Detailed Procedures for Asbestos Sampling Analyses, Non-Mandatory." EPA will treat Transmission Electron Microscopy as an equivalent method for the purposes of this rule.

In § 763.121(b) the rule establishes the action level as 0.1 f/cc averaged over 8 hours. The action level is that level at which employers must begin activities such as air monitoring, employee training, and medical surveillance.

B. Air Monitoring

This rule establishes new requirements for initial and periodic air monitoring of workplaces where asbestos abatement projects take place. Section 763.121(f) requires that employers who have a workplace or work operation covered by this standard must generally perform initial monitoring to determine the airborne concentrations of asbestos to which employees may be exposed. If employers can demonstrate that employee exposures are below the action level by means of objective data, then initial monitoring is not required. If initial monitoring indicates that employee exposures are below the PEL, daily monitoring is not required. In certain areas designated as regulated areas (discussed in Unit V.C) the employer must conduct daily monitoring unless all workers are equipped with supplied-air respirators operated in the positive pressure mode. If daily monitoring within the regulated area indicates by statistically reliable measurements that employee exposures are below the action level, no further monitoring is required for those employees whose exposures are represented by such monitoring. Employees must be given the chance to observe monitoring, and affected employees must be notified as soon as possible following the employers' receipt of the results.

C. Regulated Areas

Where airborne concentrations of asbestos exceed the PEL, the employer must establish special areas, called regulated areas, to demarcate those places. Only authorized personnel may enter regulated areas. All persons entering a regulated area must be supplied with an approved respirator, and employers must ensure that these respirators are worn. No smoking, eating, drinking, or applying cosmetics is permitted in regulated areas. Warning signs stipulated in § 763.121(k) must be displayed at each regulated area and must be posted at all approaches to regulated areas.

Wherever feasible (i.e., wherever permitted by the physical characteristics of the space where asbestos abatement takes place), § 763.121(e)(6) requires that the employer establish negative-pressure enclosures before commencing asbestos removal, demolition, and renovation operations. In these enclosures, a competent person (described in Section H) must be designated to set up the enclosure and ensure its integrity and supervise employee activity within the enclosure. In addition, the employer must conduct daily monitoring that is representative of the exposure of each employee who is assigned to work within a regulated area unless all employees are equipped with supplied-air respirators.

Section 763.121(e)(6)(iv) establishes an exemption from the requirement to maintain negative-pressure enclosures in regulated areas for small-scale, short-duration operations, such as pipe repair, valve replacement, installing drywall and other general building maintenance and repair activities.

D. Methods of Compliance

EPA stipulates in § 763.121(g)(1) the engineering and work practice controls which must be used to reduce employee exposure to within the PEL. The employer must use one or any combination of the following control methods to achieve compliance: (1) Local exhaust ventilation equipped with High Efficiency Particulate Air (HEPA) filter dust collection systems; (2) general ventilation systems; (3) asbestos vacuum cleaners equipped with HEPA filters; (4) enclosure or isolation of asbestos dust-producing processes; (5) wet methods, wetting agents, or removal encapsulants used during asbestos handling, mixing, removal, cutting, application, and clean-up; and (6) prompt disposal of asbestos-containing wastes in leak-tight containers. Respiratory protection must be used where engineering and work practice controls have been instituted but are insufficient to reduce employee exposure to or below the PEL.

Section 763.121(g)(2) states that certain work practices are prohibited. These include: (1) The use of high speed abrasive disc saws that are not equipped with appropriate engineering controls; (2) the use of compressed air to remove asbestos-containing materials, unless the compressed air is used in conjunction with an enclosed ventilation system; and (3) the spray application of asbestos-containing materials.

E. Respiratory Protection

EPA requires in § 763.121(h) that employers provide respirators and have their employees use them in the following circumstances: (1) While feasible engineering and work practice controls are being installed or implemented; (2) during activities where engineering and work practice controls are not feasible; (3) if feasible engineering and work practice controls are insufficient to reduce employee exposure to or below the exposure limit; and (4) in emergencies. Respirators must be selected according to the provisions of 30 CFR Part 11. The employers must develop a respirator program, and EPA suggests that they develop one that follows the OSHA General Industry Standards (29 CFR 1910.134). Based on available data, EPA believes that this rule would require the wearing of respirators during many asbestos abatement projects.

The rule also requires in § 763.121(h)(3) that employees who use a filter respirator must change filters whenever an increase in breathing resistance is detected. Employees who wear respirators must be allowed to wash their faces and respirator facepieces whenever necessary to prevent skin irritation associated with respirator use. An employee must not be assigned to tasks requiring the use of respirators if a physician determines that the employee is unable to function normally wearing a respirator or that the employee's safety and health or that of others would be affected by the employee's use of a respirator. In this case, the employer must assign the employee to another job which does not require the use of a respirator. The job should be with the same employer in the same geographical area, and with the same seniority, status, and rate of pay, if such a position is available.

Section 763.121(h)(4) requires that the employer must assure that a respirator issued to an employee fits properly and exhibits minimum facepiece leakage. Employers must perform quantitative or qualitative fit tests at the time of initial fitting and at least every 6 months for each employee wearing negative-pressure respirators. Appendix C describes mandatory quantitative and qualitative procedures for testing respirators.

F. Protective Clothing

Section 763.121(i) of this rule establishes the general requirement that employers must provide and require the use of protective clothing such as coveralls or similar full body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos that exceed the PEL.

The section also stipulates that asbestos-contaminated work clothing must be removed in change rooms and placed and stored in closed, labeled containers which prevent dispersion of the asbestos into the ambient environment. Protective clothing and equipment must be cleaned, laundered, repaired, or replaced to maintain their effectiveness. EPA recommends the use of disposable protective clothing, but if nondisposable clothing is worn, the employer must inform any person who launders or cleans such asbestos-contaminated clothing of the potentially harmful effects of exposure to asbestos. Contaminated clothing and equipment taken out of change rooms or the workplace for cleaning, maintenance, or disposal must be transported in sealed impermeable bags, or other closed impermeable containers and be appropriately labeled.

G. Hygiene Facilities and Practices

In § 763.121(j), EPA requires that the employer provide clean change areas for employees required to work in regulated areas who wear respirators and protective clothing. Change areas are to be equipped with separate storage facilities for protective clothing and street clothing. Section 763.121(j)(2) requires that for asbestos removal, demolition, and renovation operations, the employer must establish a decontamination area for the decontamination of asbestos-contaminated employees. This area must be adjacent and connected to the regulated area. The section describes in detail the requirements for the decontamination area which must consist of an equipment room, shower area, and clean room in series.

Section 763.121(j) also provides an exclusion for employers of workers engaged in small-scale, short-duration projects. In lieu of the clean change area requirement, the employer may permit employees engaged in the operations to clean their protective clothing with a portable HEPA-equipped vacuum before employees leave the area where maintenance was performed.

H. Information and Training

Section 763.121(k)(3) requires that the employer develop a training program for all employees who are exposed to airborne concentrations of asbestos at or above the action level. Training must be provided prior to the time of initial assignment and at least yearly thereafter. The training program must inform employees about the methods of recognizing asbestos and the health hazards of asbestos exposure; the relationship between asbestos and smoking in producing lung cancer; operations which could result in asbestos exposure; the importance of necessary protective controls to minimize exposure including, as applicable, engineering controls, work practices, respirators, housekeeping procedures, hygiene facilities, protective clothing, decontamination procedures, emergency procedures, and waste disposal procedures; the purpose, proper use, and limitations of respirators; and the medical surveillance program. All training materials must be available to the employees without cost and, upon request, to the EPA. The competent person who supervises activities in the regulated area must attend a comprehensive course on asbestos hazards and proper methods of abatement, such as the courses offered by EPA-approved Information Centers and Satellite Centers, or courses of similar length and content.

I. Housekeeping

Section 763.121(l) requires that vacuuming equipment, when used, must have HEPA filters. It also stipulates that asbestos waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated clothing consigned for disposal must be collected and disposed of in sealed, labeled, impermeable bags or other closed, labeled, impermeable containers.

J. Medical Surveillance

Section 763.121(m) requires that the employer establish a medical surveillance program, prior to assignment, for all employees who will be required to wear respirators or who will be exposed to airborne concentrations of asbestos at or above the action level for 30 or more days per year. All examinations must be performed under the supervision of a licensed physician and shall be provided without cost to the employee and at a reasonable time and place. Examinations must include: A medical and work history and physical examination with special emphasis directed to the respiratory, cardiovascular, and gastrointestinal systems; completion of a respiratory disease questionnaire; a chest X-ray administered at the discretion of the physician; and pulmonary function tests. These examinations must be made available annually, and Appendix E, a mandatory "Medical Questionnaire," must be used.

The employer must give the examining physician: A copy of this rule and its Appendix E; a description of the employee's duties relating to the employees's asbestos exposure; the exposure level or anticipated exposure level; a description of any personal protective and respiratory equipment used or to be used; and information from previous medical examinations. The employer must obtain a written signed opinion from the physician as to whether the employee has any detected medical condition that would place the employee at an increased risk from exposure to asbestos, any recommended limitations on the employee or upon the use of personal protective equipment such as clothing or respirators, and a statement that the employee has been informed by the physician of the results of the medical examination. The physician is not to reveal in the written opinion given to the employer specific findings or diagnoses unrelated to occupational exposure to asbestos. The employer must provide a copy of the physician's written opinion to the affected employee within 30 days from its receipt.

K. Recordkeeping

According to § 763.121(n), the employer must keep an accurate record of all measurements taken to monitor employee exposure to asbestos. This record should include: The date of measurement; operation involving exposure; sampling and analytical methods used, and evidence of their accuracy; number, duration and results of samples taken; type of respiratory protective devices worn; and name, social security number, and the results of all employee exposure measurements. This record must be kept for 30 years.

The employer must also maintain an accurate record for each employee subject to medical surveillance. The record must include: The name and social security number of the employee; a copy of the employee's medical complaints related to exposure to asbestos; and information provided to the examining physician as described under medical surveillance. This record must be maintained for the duration of employment plus 30 years. The employer must maintain all employee training records for 1 year beyond the last date of employment by that employee.

All records must be made available on request to the EPA, as well as to affected employees, former employees, and designated representatives. When the employer ceases to operate (e.g., because of consolidation of a school district or abolition of a special purpose district) and there is no successor employer to receive the records for the prescribed period, the employer must notify the Administrator of EPA at least 90 days prior to disposal of records.

V. Future Revisions and Exclusions for States

EPA realizes that it may be necessary to revise this rule in the future. Several parties have brought suit against OSHA challenging provisions of its Asbestos Standard. Should that litigation cause the need to revise the OSHA rule, EPA would revise the present rule to be consistent with any such revisions to the OSHA rule.

In § 763.122 EPA gives the four States which were exempt from the previous final rule 6 months, or such other reasonable time as suggested by the particular State and approved by EPA's Director of the Office of Toxic Substances, to revise their regulations to conform to the new standard. These States must submit any new regulations to the Agency for review. The Agency will review each submission to decide whether to continue excluding the State from coverage under the rule, or to amend the rule to cover the public employees in the State who are engaged in abatement work. Section 763.122(a)(1) of the rule establishes procedures for this review process.

If any other State now has or in the future adopts a regulation which is comparable to or more stringent than this rule and wishes to be excluded from this rule, that State should send a copy of the regulation to EPA's Office of Toxic Substances and request to be excluded from the rule. EPA will review the regulation, and, if it finds the regulation to be comparable to or more stringent than this rule, will propose an amendment excluding that State from coverage. Interested persons may then comment on the proposed exclusion during a period for public comment. After considering any comments, EPA could then promulgate a final amendment to the rule. These procedures are outlined in § 763.122(b) of the rule.

VI. Regulatory Assessment

EPA, in developing this final rule, has considered the requirements imposed by section 6(c)(1) of TSCA in order to determine whether asbestos or mixtures containing asbestos present an unreasonable risk. Specifically, it has considered the effects of the substance, or mixtures containing the substance, on health and the environment, and the magnitude of human and environmental exposure to the substance or mixture. It has also considered the benefits of the substance and the availability of substitutes and the reasonably ascertainable economic consequences of the rule. EPA incorporates the regulatory assessment made for the previous final rule (51 FR 15724), and assesses in this document only the incremental changes introduced by this rule.

A. Health Effects and Magnitude of Exposure to Asbestos

In the rule published in April, EPA reviewed the serious adverse human health effects associated with the use of asbestos. No additional analysis is needed for this rule. EPA's conclusions as to the health effects of asbestos were supported by the "Report to the United States Consumer Product Safety Commission (CPSC) by the Chronic Hazard Advisory Panel on Asbestos," (CHAP) (Ref. 1), "Health Effects and Magnitude of Exposure" in EPA's "Support Document for Final Rule of Friable Asbestos-Containing Materials in School Buildings" (Ref. 2), and the "Report of the [National Research Council] Committee on Nonoccupational Health Risks of Asbestiform Fibers" (Ref. 3), and were summarized more recently in the preambles to EPA's proposal entitled "Asbestos; Proposed Mining and Import Restrictions and Proposed Manufacturing, Importation and Processing Prohibitions" (51 FR 3738) and OSHA's final rule, "Occupational Exposure to Asbestos, Tremolite, Anthophyllite and Actinolite" (51 FR 22612).

The final rule published in April 1986 considered the nature of exposures to asbestos which occur in the course of abatement work, and this rule incorporates that analysis. This rule will lower the exposures due to asbestos abatement experienced by State and local public employees who take part in asbestos abatement work, State and local public employees, and building occupants, such as school children, hospital patients and visitors. It will do so because the rule lowers the PEL from 2.0 f/cc, the level set by the final rule published in August, to 0.2 f/cc, and it requires employers to provide respirators, and to establish engineering and work practice controls to reduce exposures to asbestos to this level.

B. Environmental Effects

Section 6(c) of TSCA requires that EPA state the relevant environmental factors and key considerations which form the basis for regulatory action under section 6(a). The unreasonable risk finding of this rule is based solely on risks to human health since these risks are by far the most serious consequence of unregulated removal,

enclosure, or encapsulations of friable asbestos material and are sufficient to support this rule.

C. Benefits of Asbestos Products and Availability of Substitutes

As in the previous final rule, EPA finds that the benefits of the asbestos-containing products affected by this rule are minimal. This rule applies only when persons have already decided to remove, enclose, or encapsulate friable asbestos material. These people presumably will have already determined that there are no benefits in using the asbestos-containing material in its present condition. In addition, there are adequate substitutes for the asbestos products that are being removed from buildings.

D. Economic Effects of the Rule

This portion of the preamble presents EPA's determination of the "reasonably ascertainable economic consequences of the rule, after consideration of the effect on the national economy, small business, technological innovation, the environment, and public health" as required by section 6(c)(1)(D) of TSCA.

EPA estimates that this rule will increase the cost of asbestos abatement to some extent beyond the costs stated in the preamble to the rule published in April (51 FR 15727). In its analysis of the costs of this rule (Ref. 5), EPA estimates that the rule would increase the cost of asbestos removal projects as follows:

	Cost/ project under old rule	Incremental increase in cost/ project under new rule	Projects/ year	Incremental increase in cost/ year	No. of years	Present value (r = 10%)
School	15,000	$13,930	48	$668,640	4	$2,331,449
Offices	21,000	17,702	3	53,106	15	444,247
Hospitals	61,000	45,160	2	90,320	15	755,679
Boiler	5,000	5,237	9	47,133	15	394,356
Boiler/Pipes	3,000	1,965	9	17,685	15	134,513
Total						4,060,244

This analysis assumes the removal of all friable asbestos materials by the end of 15 years, with an accelerated schedule for asbestos removal in schools. EPA acknowledges that the estimate of asbestos abatement projects may be low, because it only considers removal, and thus may miss some maintenance and repair operations. However, even if the total number of asbestos abatement projects is higher than estimated by EPA, both the costs and the benefits of the rule will have been underestimated in roughly the same proportion.

This rule will not have a direct impact on small business, since it applies only to those public employees not covered by OSHA's Asbestos Standard. However, it may have indirect effects similar to those discussed in the rule published in April (51 FR 15727), and EPA incorporates that analysis here.

EPA does not believe that this rule will restrict technological innovation. The rule allows sufficient flexibility for the development of new technology concerning asbestos abatement.

E. Evaluation of Other Statutes

Section 6(c) of TSCA requires that if EPA determines that a risk of injury to health or the environment could be eliminated or reduced to a sufficient extent by actions taken under another statute administered by EPA, EPA may not promulgate a rule under section 6(a) of TSCA unless EPA finds it is in the public interest to protect against the risk by action under TSCA. EPA finds that no other law administered by EPA will eliminate or reduce the risks to the workers associated with the removal, encapsulation, or enclosure of asbestos to a sufficient level.

The Agency has analyzed the Clean Air Act and the Resource Conservation and Recovery Act, and has come to the following conclusions. Although EPA does list asbestos as a hazardous air pollutant under the Clean Air Act, it does not have authority under that Act to issue regulations protecting workers exposed to indoor air containing asbestos fibers. The other law administered by EPA which regulates asbestos, the Resource Conservation and Recovery Act, does not give EPA authority to protect abatement workers, since it allows the Agency to regulate the substance only when it is ultimately placed in a disposal site.

Under section 9(a) of TSCA, EPA is required to review other Federal authorities not administered by EPA to determine whether action under those authorities may prevent or reduce a given risk. EPA cannot determine that there is a statute administered by another Federal agency that can prevent or reduce the risk presented to persons not covered by the OSHA Asbestos Standard during the removal, enclosure, or encapsulation of friable asbestos. EPA's analysis of this issue is in the preamble to the previous final rule (51 FR 15728) and is hereby adopted for this rule.

VII. Finding of Unreasonable Risk

EPA has weighed the health risks from asbestos abatement, as presently regulated, against the costs attributable to this regulation. In evaluating risks, it incorporates into its finding the determination made by OSHA in its notice published in the **Federal Register** of June 20, 1986 (51 FR 22612) that workers exposed to asbestos at the PEL of 2.0 f/cc face a significant risk to their health, and that the new final standard will reduce that risk. OSHA developed this finding after a lengthy rulemaking process and extended public hearings, and EPA believes that the safe finding applies to workers engaged in asbestos abatement in the public sector.

EPA estimates that the rule would increase the costs of asbestos abatement by a total of $4.0 million. This figure represents the present value of costs incurred over the next 15 years, assuming that all friable asbestos is abated. Although this rule may double the costs of some projects, the costs nonetheless are low, compared to benefits. If a State or local government has decided it can afford a project under the original final rule, the incremental cost under this amended rule should not be substantial. EPA believes that the possibility of reducing releases of asbestos during abatement under the new requirements justifies the increased costs.

EPA has concluded that the additional protection provided by this new rule outweighs the incremental costs of the control measures required, and that public employees engaged in asbestos abatement work should receive the same standard of protection as that set by OSHA for workers in the private sector. Therefore, EPA finds it is necessary to require that certain measures be taken to reduce the risk faced by asbestos abatement workers and persons using and visiting buildings during and after asbestos abatement activities.

VIII. Enforcement

Section 15 of TSCA makes it unlawful to fail or refuse to comply with any provision of a rule promulgated under section 6 of TSCA. Therefore, failure to comply with this rule would be a violation of section 15 of TSCA. In

addition, section 15 of TSCA makes it unlawful for any person to: (1) Fail or refuse to establish and maintain records as required by this rule; (2) fail or refuse to permit access to or copying of records, as required by TSCA; or (3) fail or refuse to permit entry or inspection as required by section 11 of TSCA.

Violators may be subject to both civil and criminal liability. Under the penalty provision of section 16 of TSCA, any person who violates section 15 could be subject to a civil penalty of up to $25,000 for each violation. Each day of operation in violation of this rule could constitute a separate violation. Knowing or willful violations of this rule could lead to the imposition of criminal penalties of up to $25,000 for each day of violation and imprisonment for up to 1 year. In addition, other remedies are available to EPA under sections 7 and 17 of TSCA, such as seeking an injunction to restrain violations of this rule.

IX. Rulemaking Record

EPA has established a record for this rulemaking under document control number OPTS–62050. A public version of the record and an index of documents in the record are available to the public in the Office of Toxic Substances Public Information Office from 8 a.m. to 4 p.m., Monday through Friday, except legal holidays. The Public Information Office is located in Rm. NE–004, 401 M St., SW., Washington, DC.

The record includes information considered by EPA in developing this rule. The record now includes the following categories of information: (1) Federal Register notices, (2) support documents, (3) reports, and (4) memoranda and letters.

The record also includes by reference the rulemaking record compiled by OSHA as part of the revision of the OSHA Asbestos Standard and the rulemaking record for EPA's final rule published in April 1986.

X. References

(1) USCPSC, Reports to the U.S. Consumer Product Safety Commission by the Chronic Hazard Advisory on Asbestos, July 1983.

(2) USEPA, OPTS, OTS, Support Document for Final Rule on Friable Asbestos-Containing Materials in School Buildings—Health Effects and Magnitude of Exposure, January 1982.

(3) National Research Council, "Nonoccupational Health Risks of Asbestiform Fibers", National Academy Press, Washington, DC, 1984.

(4) USDOL, OSHA, "Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite." [June 20, 1986: 51 FR 22612].

(5) USEPA, OPTS, OTS, Revision to Asbestos Abatement Worker Protection Rule: Summary of Cost-Effectiveness Analysis, December 1986.

XI. Regulatory Assessment Requirements

A. Executive Order 12291

Under Executive Order 12291, EPA prepared a Regulatory Impact Analysis. The Analysis estimated that this rule, would cost about $4.2 over 15 years. EPA believes that these costs are reasonable. Under Executive Order 12291, EPA must judge whether a regulation is "major" and therefore requires a Regulatory Impact Analysis. EPA has determined that this rule is not a "Major Rule" because it will not have an effect on the economy of $100 million or more and it will not have a significant effect on competition, costs, or prices.

This rule was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291.

B. Regulatory Flexibility Act

EPA has analyzed the economic impact of this rule on small businesses. Reference to EPA's analysis appears in Unit VI.D.

C. Paperwork Reduction Act

The information collection requirements contained in this rule have been approved by OMB under the provisions of the Paperwork Reduction Act of 1980, 44 U.S.C 3501 *et seq.* and have been assigned OMB control number 2070–0072.

List of Subjects in 40 CFR Part 763

Asbestos, Environmental protection, Hazardous substances, Reporting and recordkeeping requirements.

Dated: February 6, 1987.

Lee M. Thomas,

Administrator.

PART 763—[AMENDED]

Therefore, 40 CFR Part 763 is amended as follows:

1. The authority citation for Part 763 is revised to read as follows, and all of the section or subpart authorities are removed:

Authority: 15 U.S.C. 2605 and 2607(a).

2. Subpart G consisting of §§ 763.120 through 763.126 is revised to read as follows:

Subpart G—Asbestos Abatement Projects

Sec.

Subpart G—Asbestos Abatement Projects

§ 763.120 Scope.

(a) This part establishes requirements which must be followed during asbestos abatement projects by employers of State and local government employees not covered by the Asbestos Standard of the Occupational Safety and Health Administration (OSHA), 29 CFR 1926.58, an Asbestos Standard adopted by a State as part of a State plan approved by OSHA under section 18 of the Occupational Safety and Health Act, or a State asbestos regulation which EPA has determined to be comparable to or more stringent than this part. The rule covers those employees who take part in asbestos abatement work.

(b) [Reserved]

§ 763.121 Regulatory requirements.

(a) [Reserved]

(b) *Definitions.* "Action level" means an airborne concentration of asbestos of 0.1 fiber per cubic centimeter (f/cc) of air calculated as an 8-hour time-weighted average.

"Administrator" means the Administrator, U.S. Environmental Protection Agency, or designee.

"Asbestos" means the asbestiform varieties of chrysotile (serpentine); crocidolite (riebeckite); amosite (cummingtonit—grunerite); tremolite; anthophyllite, and actinolite.

"Asbestos abatement project" means any activity involving the removal, enclosure, or encapsulation of friable asbestos material.

"Authorized person" means any person authorized by the employer and required by work duties to be present in regulated areas.

"Clean room" means an uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

"Competent person" means one who is capable of identifying existing asbestos hazards in the workplace and who has the authority to take prompt corrective measures to eliminate them. The duties of the competent person include at least the following: Establishing the negative-pressure enclosure, ensuring its integrity, and controlling entry to and exit from the enclosure; supervising any employee exposure monitoring required by this subpart, ensuring that all employees working within such an enclosure wear the appropriate personal protective equipment, are trained in the use of appropriate methods of exposure control, and use the hygiene facilities

and decontamination procedures specified in this subpart; and ensuring that engineering controls in use are in proper operating condition and are functioning properly.

"Decontamination area" means an enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment contaminated with asbestos.

"Demolition" means the wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

"Emergency project" means a project involving the removal, enclosure, or encapsulation of friable asbestos-containing material that was not planned but results from a sudden unexpected event.

"Employee exposure" means that exposure to airborne asbestos would occur if the employee were not using respiratory protective equipment.

"Employer" means the public department, agency, or entity which hires an employee. The term includes, but is not limited to, any State, County, City, or other local governmental entity which operates or administers schools, a department of health or human services, a library, a police department, a fire department, or similar public service agencies or offices.

"Equipment room (change room)" means a contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

"Fiber" means a particulate form of asbestos, 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

"Friable asbestos material" means any material containing more than 1 percent asbestos by weight which, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure.

"High-efficiency particulate air (HEPA) filter" means a filter capable of trapping and retaining at least 99.97 percent of all monodispersed particles of 0.3 micrometer in diameter or larger.

"Regulated area" means an area established by the employer to demarcate areas where airborne concentrations of asbestos exceed or can reasonably be expected to exceed the permissible exposure limit. The regulated area may take the form of: (1) A temporary enclosure, as required by paragraph (e)(6) of this section, or (2) an area demarcated in any manner that minimizes the number of employees exposed to asbestos.

"Removal" means the taking out or stripping of asbestos or materials containing asbestos.

"Renovation" means the modifying of any existing structure, or portion thereof, where exposure to airborne asbestos may result.

"Repair" means overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates where asbestos is present.

(c) *Permissible exposure limit (PEL).* The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.2 fiber per cubic centimeter of air as an 8-hour time-weighted average (TWA), as determined by the method prescribed in Appendix A of this section, or by an equivalent method.

(d) *Communication among employers.* On multi-employer worksites, an employer performing asbestos work requiring the establishment of a regulated area shall inform other employers (as defined by this subpart and by 29 U.S.C. section 652(5)) on the site of the nature of the employer's work with asbestos and of the existence of and requirements pertaining to regulated areas.

(e) *Regulated areas*—(1) *General.* The employer shall establish a regulated area in work areas where airborne concentrations of asbestos exceed or can reasonably be expected to exceed the permissible exposure limit prescribed in paragraph (c) of this section.

(2) *Demarcation.* The regulated area shall be demarcated in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne concentrations of asbestos in excess of the permissible exposure limit.

(3) *Access.* Access to regulated areas shall be limited to authorized persons.

(4) *Respirators.* All persons entering a regulated area shall be supplied with a respirator, selected in accordance with paragraph (h)(2) of this section.

(5) *Prohibited activities.* The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the regulated area.

(6) *Requirements for asbestos removal, demolition, and renovation operations.* (i) Wherever feasible, the employer shall establish negative-pressure enclosures before commencing removal, demolition, and renovation operations.

(ii) The employer shall designate a competent person to perform or supervise the following duties:

(A) Set up the enclosure.

(B) Ensure the integrity of the enclosure.

(C) Control entry to and exit from the enclosure.

(D) Supervise all employee exposure monitoring required by this section.

(E) Ensure that employees working within the enclosure wear respirators and protective clothing as required by paragraphs (h) and (i) of this section.

(F) Ensure that employees are trained in the use of engineering controls, work practices, and personal protective equipment.

(G) Ensure that employees use the hygiene facilities and observe the decontamination procedures specified in paragraph (j) of this section.

(H) Ensure that engineering controls are functioning properly.

(iii)(A) In addition to the qualifications specified in paragraph (b) of this section, the competent person shall be trained in all aspects of asbestos abatement, the contents of this subpart, the identification of asbestos and its removal procedures, and other practices for reducing the hazard. Such training shall be obtained in a comprehensive course, such as a course conducted by an EPA Asbestos Training Center, or an equivalent course.

(B) For small-scale, short-duration operations, such as pipe repair, valve replacement, installing electrical conduits, installing or removing drywall, roofing, and other general building maintenance or renovation, the employer is not required to comply with the requirements of paragraph (e)(6) of this section.

(f) *Exposure monitoring*—(1) *General.* (i) Each employer who has a workplace or work operation covered by this subpart shall perform monitoring to determine accurately the airborne concentrations of asbestos to which employees may be exposed.

(ii) Determinations of employee exposure shall be made from breathing zone air samples that are representative of the 8-hour TWA of each employee.

(iii) Representative 8-hour TWA employee exposure shall be determined on the basis of one or more samples representing fullshift exposure for employees in each work area.

(2) *Initial monitoring.* (i) Each employer who has a workplace or work operation covered by this subpart, except as provided for in paragraphs (f)(2)(ii) and (iii) of this section, shall perform initial monitoring at the initiation of each asbestos job to determine accurately the airborne concentrations of asbestos to which employees may be exposed.

(ii) The employer may demonstrate that employee exposures are below the action level by means of objective data demonstrating that the product or material containing asbestos cannot release airborne fibers in concentrations exceeding the action level under those work conditions having the greatest potential for releasing asbestos.

(iii) Where the employer has monitored each asbestos job, and the data were obtained during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraph (f)(2)(i) of this section.

(3) *Periodic monitoring within regulated areas.* (i) The employer shall conduct daily monitoring that is representative of the exposure of each employee who is assigned to work within a regulated area.

(ii) When all employees within a regulated area are equipped with supplied-air respirators operated in the positive-pressure mode, the employer may dispense with the daily monitoring required by this paragraph.

(4) *Termination of monitoring.* If the periodic monitoring required by paragraph (f)(3)(i) of this section reveals that employee exposures, as indicated by statistically reliable measurements, are below the action level, the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.

(5) *Method of monitoring.* (i) All samples taken to satisfy the monitoring requirements of paragraph (f) of this section shall be personal samples collected following the procedures specified in Appendix A of this section.

(ii) All samples taken to satisfy the monitoring requirements of paragraph (f) of this section shall be evaluated using the EPA/OSHA Reference Method (ORM) specified in Appendix A, or an equivalent counting method.

(iii) If an equivalent method to the ORM is used, the employer shall ensure that the method meets the following criteria:

(A) Replicate exposure data used to establish equivalency are collected in side-by-side field and laboratory comparisons.

(B) The comparison indicates that 90 percent of the samples collected in the range 0.5 to 2.0 times the permissible limit have an accuracy range of plus or minus 25 percent of the ORM results with a 95 percent confidence level as demonstrated by a statistically valid protocol.

(C) The equivalent method is documented and the results of the comparison testing are maintained.

(iv) To satisfy the monitoring requirements of paragraph (f) of this section, employers shall rely on the results of monitoring analysis performed by laboratories that have instituted quality assurance programs that include the elements prescribed in Appendix A of this section.

(6) *Employee notification of monitoring results.* (i) The employer shall notify affected employees of the monitoring results that represent the employees' exposure as soon as possible following receipt of monitoring results.

(ii) The employer shall notify affected employees of the results of monitoring representing the employees' exposure in writing either individually or by posting at a centrally located place that is accessible to affected employees.

(7) *Observation of monitoring.* (i) The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to asbestos conducted in accordance with this section

(ii) When observation of the monitoring of employee exposure to asbestos requires entry into an area where the use of protective clothing or equipment is required, the observer shall be provided with and be required to use such clothing and equipment and shall comply with all other applicable safety and health procedures.

(g) *Methods of compliance*—(1) *Engineering controls and work practices.* (i) The employer shall use one or any combination of the following control methods to achieve compliance with the permissible exposure limit prescribed by paragraph (c) of this section:

(A) Local exhaust ventilation equipped with HEPA filter dust collection systems.

(B) General ventilation systems.

(C) Vacuum cleaners equipped with HEPA filters.

(D) Enclosure or isolation of processes producing asbestos dust.

(E) Use of wet methods, wetting agents, or removal encapsulants to control employee exposures during asbestos handling, mixing, removal, cutting, application, and cleanup.

(F) Prompt disposal of wastes contaminated with asbestos in leak-tight containers.

(G) Use of work practices or other engineering controls that the Administrator can show to be feasible.

(ii) Wherever the feasible engineering and work practice controls described in this paragraph are not sufficient to reduce employee exposure to or below the limit prescribed in paragraph (c) of this section, the employer shall use them to reduce employee exposure to the lowest levels attainable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (h) of this section.

(2) *Prohibitions.* (i) High-speed abrasive disc saws that are not equipped with appropriate engineering controls shall not be used for work related to asbestos.

(ii) Compressed air shall not be used to remove asbestos materials containing asbestos unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

(iii) Materials containing asbestos shall not be applied by spray methods.

(3) *Employee rotation.* The employer shall not use employee rotation as a means of compliance with the exposure limit prescribed in paragraph (c) of this section.

(h) *Respiratory protection*—(1) *General.* The employer shall provide respirators, and ensure that they are used, where required by this section. Respirators shall be used in the following circumstances:

(i) During the interval necessary to install or implement feasible engineering and work practice controls.

(ii) In work operations such as maintenance and repair activities, or other activities for which engineering and work practice controls are not feasible.

(iii) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the exposure limit.

(iv) In emergencies.

(2) *Respirator selection.* (i) Where respirators are used, the employer shall select and provide, at no cost to the employee, the appropriate respirator as specified in Table 1 in paragraph (iv), and shall ensure that the employee uses the respirator provided.

(ii) The employer shall select respirators from among those jointly approved as being acceptable for protection by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part 11.

(iii) The employer shall provide a powered, air-purifying respirator in lieu

of any negative-pressure respirator specified in Table 1 whenever:

(A) An employee chooses to use this type of respirator; and

(B) This respirator will provide adequate protection to the employee.

(iv) Table 1—Respiratory Protection for Asbestos Fibers.

TABLE 1.—RESPIRATORY PROTECTION FOR ASBESTOS FIBERS

Airborne concentration of asbestos	Required respirator
Not in excess of 2 f/cc (10×PEL).	1. Half-mask air-purifying respirator equipped with high-efficiency filters.
Not in excess of 10 f/cc (50×PEL).	1. Full facepiece air-purifying respirator equipped with high-efficiency filters.
Not in excess of 20 f/cc (100×PEL).	1. Any powered air-purifying respirator equipped with high-efficiency filters. 2. Any supplied-air respirator operated in continuous flow mode.
Not in excess of 200 f/cc (1,000×PEL).	1. Full facepiece supplied-air respirator operated in pressure demand mode.
Greater than 200 f/cc (>1,000×PEL) or unknown concentration.	1. Full facepiece supplied air respirator operated in pressure demand mode equipped with an auxiliary positive pressure selfcontained breathing apparatus.

Note.—a. Respirators assigned for higher environmental concentrations may be used at lower concentrations.

b. A high-efficiency filter means a filter that is at least 99.97 percent efficient against mono-dispersed particles of 0.3 micrometers in diameter or larger.

(3) *Respirator program.* (i) Where respiratory protection is used, the employee shall institute a respirator program. This should include all information and guidance necessary for their proper selection, use, and care. Possible emergency uses of respirators should be anticipated and planned for.

(ii) The employer shall permit each employee who uses a filter respirator to change the filter elements whenever an increase in breathing resistance is detected and shall maintain an adequate supply of filter elements for this purpose.

(iii) Employees who wear respirators shall be permitted to leave work areas to wash their faces and respirator facepieces whenever necessary to prevent skin irritation associated with respirator use.

(iv) No employee shall be assigned to tasks requiring the use of respirators if, based on his or her most recent examination, an examining physician determines that the employee will be unable to function normally wearing a respirator, or that the safety or health of the employee or of other employees will be impaired by the use of a respirator. Such employee shall be assigned to another job or given the opportunity to transfer to a different position, the duties of which he or she is able to perform, with the same employer, in the same geographical area, and with the same seniority, status, and rate of pay he or she had just prior to such transfer, if such a different position is available.

(4) *Respirator fit testing.* (i) The employer shall ensure that the respirator issued to the employee exhibits the least possible facepiece leakage and that the respirator is fitted properly.

(ii) Employers shall perform either quantitative or qualitative face fit tests at the time of initial fitting and at least every 6 months thereafter for each employee wearing a negative-pressure respirator. The qualitative fit tests may be used only for testing the fit of half-mask respirators where they are permitted to be worn, and shall be conducted in accordance with Appendix C of this section. The tests shall be used to select facepieces that provide the required protection as prescribed in Table 1.

(i) *Protective clothing*—(1) *General.* The employer shall provide and require the use of protective clothing, such as coveralls or similar whole-body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos that exceed the permissible exposure limit prescribed in paragraph (c) of this section.

(2) *Laundering.* (i) The employer shall ensure that laundering of contaminated clothing is done so as to prevent the release of airborne asbestos in excess of the exposure limit prescribed in paragraph (c) of this section.

(ii) Any employer who gives contaminated clothing to another person for laundering shall inform such person of the requirement in paragraph (i)(2)(i) of this section effectively to prevent the release of airborne asbestos in excess of the exposure limit prescribed in paragraph (c) of this section.

(3) *Contaminated clothing.* Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and be labeled in accordance with paragraph (k) of this section.

(4) *Protective clothing for removal, demolition, and renovation operations.* (i) The competent person shall periodically examine worksuits worn by employees for rips or tears that may occur during performance of work.

(ii) When rips or tears are detected while an employee is working within a negative-pressure enclosure, rips and tears shall be immediately mended, or the worksuit shall be immediately replaced.

(j) *Hygiene facilities and practices*—(1) *General.* (i)(A) The employer shall provide clean change areas for employees required to work in regulated areas or required by paragraph (i)(1) of this section to wear protective clothing.

(B) In lieu of the change area requirement specified in paragraph (j)(1)(i), the employer may permit employees engaged in small-scale, short-duration operations, as described in paragraph (e)(6) of this section, to clean their protective clothing with a portable HEPA-equipped vacuum before such employees leave the area where maintenance was performed.

(ii) The employer shall ensure that change areas are equipped with separate storage facilities for protective clothing and street clothing.

(iii) Whenever food or beverages are consumed at the worksite and employees are exposed to airborne concentrations of asbestos in excess of the permissible exposure limit, the employer shall provide lunch areas in which the airborne concentrations of asbestos are below the action level.

(2) *Requirements for removal, demolition, and renovation operations*—(i) *Decontamination area.* Except for small-scale, short-duration operations, as described in paragraph (e)(6) of this section, the employer shall establish a decontamination area that is adjacent and connected to the regulated area for the decontamination of employees contaminated with asbestos. The decontamination area shall consist of an equipment room, shower area, and clean room in series. The employer shall ensure that employees enter and exit the regulated area through the decontamination area.

(ii) *Clean room.* The clean room shall be equipped with a locker or appropriate storage container for each employee's use.

(iii) *Shower area.* Where feasible, shower facilities shall be provided. The showers shall be contiguous both to the equipment room and the clean change room, unless the employer can demonstrate that this location is not feasible. Where the employer can demonstrate that it is not feasible to locate the shower between the equipment room and the clean change room, the employer shall ensure that employees:

(A) Remove asbestos contamination from their worksuits using a HEPA vacuum before proceeding to a shower that is not contiguous to the work area; or

(B) Remove their contaminated worksuits, don clean worksuits, and proceed to a shower that is not contiguous to the work area.

(iv) *Equipment room.* The equipment room shall be supplied with

impermeable, labeled bags and containers for the containment and disposal of contaminated protective clothing and equipment.

(v) *Decontamination area entry procedures.* (A) The employer shall ensure that employees:

(*1*) Enter the decontamination area through the clean room.

(*2*) Remove and deposit street clothing within a locker provided for their use.

(*3*) Put on protective clothing and respiratory protection before leaving the clean room.

(B) The employer shall ensure that employees pass through the equipment room before entering the enclosure.

(vi) *Decontamination area exit procedures.* (A) The employer shall ensure that employees remove all gross contamination and debris from their protective clothing before leaving the regulated area.

(B) The employer shall ensure that employees remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers.

(C) The employer shall ensure that employees do not remove their respirators in the equipment room.

(D) The employer shall ensure that employees shower prior to entering the clean room.

(E) The employer shall ensure that, after showering, employees enter the clean room before changing into street clothes.

(k) *Communication of hazards to employees*—(1) *Signs.* (i) Warning signs that demarcate the regulated area shall be provided and displayed at each location where airborne concentrations of asbestos may be in excess of the exposure limit prescribed in paragraph (c) of this section. Signs shall be posted at such a distance from such a location that an employee may read the signs and take necessary protective steps before entering the area marked by the signs.

(ii) The warning signs required by paragraph (k)(1)(i) of this section shall bear the following information:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE
CLOTHING ARE REQUIRED IN THIS
AREA

(2) *Labels.* (i) Labels shall be affixed to all products containing asbestos and to all containers containing such products, including waste containers. Where feasible, installed asbestos products shall contain a visible label.

(ii) Labels shall be printed in large, bold letters on a contrasting background.

(iii) Labels shall be used and shall contain the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

(iv) [Reserved]

(v) Labels shall contain a warning statement against breathing airborne asbestos fibers.

(vi) The provisions for labels required by paragraph (k)(2)(i) of this section do not apply where:

(A) Asbestos fibers have been modified by a bonding agent, coating, binder, or other material, provided that the manufacturer can demonstrate that, during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the action level will be released or

(B) Asbestos is present in a product in concentrations less than 0.1 percent by weight.

(3) *Employee information and training.* (i) The employer shall institute a training program for all employees exposed to airborne concentrations of asbestos in excess of the action level and shall ensure their participation in the program.

(ii) Training shall be provided prior to or at the time of initial assignment, unless the employee has received equivalent training within the previous 12 months, and at least annually thereafter.

(iii) The training program shall be conducted in a manner that the employee is able to understand. The employer shall ensure that each employee is informed of the following:

(A) Methods of recognizing asbestos.

(B) The health effects associated with asbestos exposure.

(C) The relationship between smoking and asbestos in producing lung cancer.

(D) The nature of operations that could result in exposure to asbestos, the importance of necessary protective controls to minimize exposure including, as applicable, engineering controls, work practices, respirators, housekeeping procedures, hygiene facilities, protective clothing, decontamination procedures, emergency procedures, and waste disposal procedures, and any necessary instruction in the use of these controls and procedures.

(E) The purpose, proper use, fitting instructions, and limitations of respirators.

(F) The appropriate work practices for performing the asbestos job; and

(G) Medical surveillance program requirements.

(H) A review of this subpart, including appendices.

(4) *Access to training materials.* (i) The employer shall make readily available to all affected employees without cost all written materials relating to the employee training program, including a copy of this regulation.

(ii) The employer shall provide to the Administrator upon request, all information and training materials relating to the employee information and training program.

(l) *Housekeeping*—(1) *Vacuuming.* Where vacuuming methods are selected, HEPA filtered vacuuming equipment must be used. The equipment shall be used and emptied in a manner that minimizes the reentry of asbestos into the workplace.

(2) *Waste disposal.* Asbestos waste, scrap, debris, bags, containers, equipment, and contaminated clothing consigned for disposal shall be collected and disposed of in sealed, labeled, impermeable bags or other closed, labeled, impermeable containers.

(m) *Medical surveillance*—(1) *General—(i)—Employees covered.* The employer shall institute a medical surveillance program for all employees engaged in work involving levels of asbestos at or above the action level for 30 or more days per year, or who are required by this section to wear negative-pressure respirators.

(ii) *Examination by a physician.* (A) The employer shall ensure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and are provided at no cost to the employee and at a reasonable time and place.

(B) Persons other than such licensed physicians who administer the pulmonary function testing required by this section shall complete a training course in spirometry sponsored by an appropriate academic or professional institution.

(2) *Medical examinations and consultation*—(i) *Frequency.* The employer shall make available medical examinations and consultations to each employee covered under paragraph (m)(1)(i) of this section on the following schedules:

(A) Prior to assignment of the employee to an area where negative-pressure respirators are worn.

(B)(*1*) When the employee is assigned to an area where exposure to asbestos may be at or above the action level for

30 or more days per year, a medical examination must be given within 10 working days following the thirtieth day of exposure.

(2) No medical examination is required of any employee if adequate records show that the employee has been examined in accordance with this paragraph within the past 1-year period.

(C) At least annually thereafter.

(D) If the examining physician determines that any of the examinations should be provided more frequently than specified, the employer shall provide such examinations to affected employees at the frequencies specified by the physician.

(ii) *Content.* Medical examinations made available pursuant to paragraphs (m)(2)(i) (A), (B), and (C) of this section shall include:

(A) A medical and work history with special emphasis directed to the pulmonary, cardiovascular, and gastrointestinal systems.

(B) On initial examination, the standardized questionnaire contained in Appendix D, Part 1 of this section and, on annual examination, the abbreviated standardized questionnaire contained in Appendix D, Part 2 of this section.

(C) A physical examination directed to the pulmonary and gastrointestinal systems, including a chest roentgenogram to be administered at the discretion of the physician, and pulmonary function tests of forced vital capacity (FVC) and forced expiratory volume at one second (FEV_1). Interpretation and classification of chest roentgenograms shall be conducted in accordance with Appendix E of this section.

(D) Any other examinations or tests deemed necessary by the examining physician.

(3) *Information provided to the physician.* The employer shall provide the following information to the examining physician:

(i) A copy of this rule and Appendices D, E, and I of this section.

(ii) A description of the affected employee's duties as they relate to the employee's exposure.

(iii) The employee's representative exposure level or anticipated exposure level.

(iv) A description of any personal protective and respiratory equipment used or to be used.

(v) Information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

(4) *Physician's written opinion.* (i) The employer shall obtain a written opinion from the examining physician. This written opinion shall contain the results of the medical examination and shall include:

(A) The physician's opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of material health impairment from exposure to asbestos.

(B) Any recommended limitations on the employee or on the use of personal protective equipment such as respirators.

(C) A statement that the employee has been informed by the physician of the results of the medical examinations and of any medical conditions that may result from asbestos exposure.

(ii) The employer shall instruct the physician not to reveal in the written opinion given to the employer specific findings or diagnoses unrelated to occupational exposure to asbestos.

(iii) The employer shall provide a copy of the physician's written opinion to the affected employee within 30 days from its receipt.

(n) *Recordkeeping*—(1) *Objective data for exempted operations.* (i) Where the employer has relied on objective data that demonstrate that products made from or containing asbestos are not capable of releasing fibers of asbestos in concentrations at or above the action level under the expected conditions of processing, use, or handling to exempt such operations from the initial monitoring requirements under paragraph (f)(2) of this section, the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

(ii) The record shall include at least the following information:

(A) The product qualifying for exemption.

(B) The source of the objective data.

(C) The testing protocol, results of testing, and/or analysis of the material for the release of asbestos.

(D) A description of the operation exempted and how the data support the exemption.

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(2) *Exposure measurements.* (i)(A) The employer shall keep an accurate record of all measurements taken to monitor employee exposure to asbestos as prescribed in paragraph (f) of this section.

(B) The employer may utilize the services of competent organizations such as employee associations to maintain the records required by this section.

(ii) This record shall include at least the following information:

(A) The date of measurement.

(B) The operation involving exposure to asbestos that is being monitored.

(C) Sampling and analytical methods used and evidence of their accuracy.

(D) Number, duration, and results of samples taken.

(E) Type of protective devices worn, if any.

(F) Name, social security number, and exposure of the employees whose exposures are represented.

(iii) The employer shall maintain this record for at least 30 years.

(3) *Medical surveillance.* (i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance by paragraph (m) of this section.

(ii) The record shall include at least the following information:

(A) The name and social security number of the employee.

(B) A copy of the employee's medical examination results, including the medical history, questionnaire responses, results of any tests, and physician's recommendations.

(C) Physician's written opinions.

(D) Any employee medical complaints related to exposure to asbestos.

(E) A copy of the information provided to the physician as required by paragraph (m) of this section.

(iii) The employer shall ensure that this record is maintained for the duration of employment plus 30 years.

(4) *Training records.* The employer shall maintain all employee training records for 1 year beyond the last date of employment by that employer.

(5) *Availability.* (i) The employer, upon request, shall make all records required to be maintained by this section available to the Administrator for examination and copying.

(ii) The employer, upon request, shall make any exposure records required by paragraphs (f) and (n) of this section available for examination and copying to affected employees, former employees, designated representatives, and the Administrator.

(iii) The employer, upon request, shall make employee medical records required by paragraphs (m) and (n) of this section available for examination and copying to the subject employee, anyone having the specific written consent of the subject employee, and the Administrator.

(6) *Transfer of records.* Whenever the employer ceases to operate and there is no successor employer to receive and

retain the records for the prescribed period, the employer shall notify the Administrator at least 90 days prior to disposal and, upon request, transmit them to the Administrator.

(o) *Effective date.* This section shall become effective March 27, 1987.

(p) *Appendices.* (1) Appendices A, C, D, and E to this section are incorporated as part of this section and the contents of these appendices are mandatory.

(2) Appendix B to this section is informational and is not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

Appendix A To § 763.121—EPA/OSHA Reference Method—Mandatory

This mandatory appendix specifies the procedure for analyzing air samples for asbestos and specifies quality control procedures that must be implemented by laboratories performing the analysis. The sampling and analytical methods described below represent the elements of the available monitoring methods essential to achieve adequate employee exposure monitoring while allowing employers to use methods that are already established within their organizations. All employers who are required to conduct air monitoring under § 763.121(f) are required to utilize analytical laboratories that use this procedure, or an equivalent method for collecting and analyzing samples.

Sampling and Analytical Procedure

1. The sampling medium for air samples shall be mixed cellulose ester filter membranes. These shall be designated by the manufacturer as suitable for asbestos counting. See below for rejection of blanks.

2. The preferred collection device shall be the 25-mm diameter cassette with an open-faced 50-mm extension cowl. The 37-mm cassette may be used if necessary, but only if written justification for the need to use the 37-mm filter cassette accompanies the sample results in the employee's exposure monitoring record.

3. An air flow rate between 0.5 liter/min and 2.5 liters/min shall be selected for the 25-mm cassette. If the 37-mm cassette is used, an air flow rate between 1 liter/min and 2.5 liters/min shall be selected.

4. Where possible, a sufficient air volume for each air sample shall be collected to yield between 100 and 1,300 fibers per square millimeter on the membrane filter. If a filter darkens in appearance or if loose dust is seen on the filter, a second sample shall be started.

5. Ship the samples in a rigid container with sufficient packing material to prevent dislodging the collected fibers. Packing material that has a high electrostatic charge on its surface (e.g., expanded polystyrene) cannot be used because such material can cause loss of fibers to the sides of the cassette.

6. Calibrate each personal sampling pump before and after use with a representative filter cassette installed between the pump and the calibration devices.

7. Personal samples shall be taken in the "breathing zone" of the employee (i.e., attached to or near the collar or lapel near the worker's face).

8. Fiber counts shall be made by positive phase contrast using a microscope with an 8 to 10 X eyepiece and a 40 to 45 X objective for a total magnification of approximately 400 X and a numerical aperture of 0.65 to 0.75. The microscope shall also be fitted with a green or blue filter.

9. The microscope shall be fitted with a Walton-Beckett eyepiece graticule calibrated for a field diameter of 100 micrometers (± 2 micrometers).

10. The phase-shift detection limit of the microscope shall be about 3 degrees measured using the HSE phase shift test slide as outlined below.

a. Place the test slide on the microscope stage and center it under the phase objective.

b. Bring the blocks of grooved lines into focus.

Note.—The slide consists of seven sets of grooved lines (ca. 20 grooves to each block) in descending order of visibility from sets 1 to 7, seven being the least visible. The requirements for asbestos counting are that the microscope optics must resolve the grooved lines in set 3 completely, although they may appear somewhat faint, and that the grooved lines in sets 6 and 7 must be invisible. Sets 4 and 5 must be at least partially visible but may vary slightly in visibility between microscopes. A microscope that fails to meet these requirements has either too low or too high a resolution to be used for asbestos counting.

c. If the image deteriorates, clean and adjust the microscope optics. If the problem persists, consult the microscope manufacturer.

11. Each set of samples taken will include 10 percent blanks or a minimum of 2 blanks. The blank results shall be averaged and subtracted from the analytical results before reporting. Any samples represented by a blank having a fiber count in excess of 7 fibers/100 fields shall be rejected.

12. The samples shall be mounted by the acetone/triacetin method or a method with an equivalent index of refraction and similar clarity.

13. Observe the following counting rules.

a. Count only fiber equal to or longer than 5 micrometers. Measure the length of curved fibers along the curve.

b. Count all particles as asbestos that have a length-to-width ratio (aspect ratio) of 3:1 or greater.

c. Fibers lying entirely within the boundary of the Walton-Beckett graticule field shall receive a count of 1. Fibers crossing the boundary once, having one end within the circle, shall receive the count of one-half (½). Do not count any fiber that crosses the graticule boundary more than once. Reject and do not count any other fibers even though they may be visible outside the graticule area.

d. Count bundles of fibers as one fiber unless individual fibers can be identified by observing both ends of an individual fiber.

e. Count enough graticule fields to yield 100 fibers. Count a minimum of 20 fields; stop counting at 100 fields regardless of fiber count.

14. Blind recounts shall be conducted at the rate of 10 percent.

Quality Control Procedures

1. *Intralaboratory program.* Each laboratory and/or each company with more than one microscopist counting slides shall establish a statistically designed quality assurance program involving blind recounts and comparisons between microscopists to monitor the variability of counting by each microscopist and between microscopists. In a company with more than one laboratory, the program shall include all laboratories and shall also evaluate the laboratory-to-laboratory variability.

2. *Interlaboratory program.* Each laboratory analyzing asbestos samples for compliance determination shall implement an interlaboratory quality assurance program that as a minimum includes participation of at least two other independent laboratories. Each laboratory shall participate in round robin testing at least once every 6 months with at least all the other laboratories in its interlaboratory quality assurance group. Each laboratory shall submit slides typical of its own work load for use in this program. The round robin shall be designed and results analyzed using appropriate statistical methodology.

3. All individuals performing asbestos analysis must have taken the NIOSH course for sampling and evaluating airborne asbestos dust or an equivalent course.

4. When the use of different microscopes contributes to differences between counters and laboratories, the effect of the different microscope shall be evaluated and the microscope shall be replaced, as necessary.

5. Current results of these quality assurance programs shall be posted in each laboratory to keep the microscopists informed.

Appendix B to § 763.121—Detailed Procedure for Asbestos Sampling and Analysis—Non-Mandatory

This appendix contains a detailed procedure for sampling and analysis and includes those critical elements specified in Appendix A of this section. Employers are not required to use this procedure, but they are required to use Appendix A of this section. The purpose of Appendix B of this section is to provide a detailed step-by-step sampling and analysis procedure that conforms to the elements specified in Appendix A of this section. Since this procedure may also standardize the analysis and reduce variability, EPA encourages employers to use this appendix.

Technique: Microscopy, Phase Contrast.

Analyte: Fibers (manual count).

Sample Preparation: Acetone/triacetin method.

Calibration: Phase-shift detection limit about 3 degrees.

Range: 100 to 1,300 fibers/mm ^{2} filter area.

Estimated Limit of Detection: 7 fibers/mm ^{2} filter area.

Sampler: Filter (0.8–1.2 μm mixed cellulose ester membrane, 25-mm diameter).

Flow Rate: 0.5 l/min to 2.5 l/min (25-mm cassette); 1.0 l/min to 2.5 l/min (37-mm cassette).

Sample Volume: Adjust to obtain 100 to 1,300 fibers/mm ^{2}.

Shipment: Routine.

Sample Stability: Indefinite.

Blanks: 10% of samples (minimum 2).

Standard Analytical Error: 0.25.

Applicability: The working range is 0.02 f/cc (1920–L air sample) to 1.25 f/cc (400–L sample). The method gives an index of airborne asbestos fibers but may be used for other materials such as fibrous glass by inserting suitable parameters into the counting rules. The method does not differentiate between asbestos and other fibers. Asbestos fibers less than ca. 0.25 μm diameter will not be detected by this method.

Interferences: Any other airborne fiber may interfere since all particles meeting the counting criteria are counted. Chain-like particles may appear fibrous. High levels of nonfibrous dust particles may obscure fibers in the field of view and raise the detection limit.

Reagents:

1. Acetone.
2. Triacetin (glycerol triacetate), reagent grade.

Special Precautions: Acetone is an extremely flammable liquid and precautions must be taken not to ignite it. Heating of acetone must be done in a ventilated laboratory fume hood using a flameless, spark-free heat source.

Equipment:

1. *Collection device:* 25-mm cassette with 50-mm extension cowl with cellulose ester filter, 0.8 to 1.2 mm pore size and backup pad.

Note.—Analyze representative filters for fiber background before use and discard the filter lot if more than 5 fibers/100 fields are found.

2. Personal sampling pump, greater than or equal to 0.5 l/min, with flexible connecting tubing.
3. Microscope, phase contrast, with green or blue filter, 8 to 10X eyepiece, and 40 to 45X phase objective (total magnification ca. 400X); numerical aperture=0.65 to 0.75.
4. Slides, glass, single-frosted, pre-cleaned, 25 x 75 mm.
5. Cover slips, 25 x 25 mm, No. 1½ unless otherwise specified by microscope manufacturer.
6. Knife, #1 surgical steel, curved blade.
7. Tweezers.
8. Flask, Guth-type, insulated neck, 250 to 500 mL (with single-holed rubber stopper and elbow-jointed glass tubing, 16 to 22 cm long).
9. Hotplate, spark-free, stirring type; heating mantle; or infrared lamp and magnetic stirrer.
10. Syringe, hypodermic, with 22-gauge needle.
11. Graticule, Walton-Beckett type with 100 μm diameter circular field at the specimen plane (area=0.00785 mm ^{2}), (Type G–22).

Note.—The graticule is custom-made for each microscope.

12. HSE/NPL phase contrast test slide, Mark II.
13. Telescope, ocular phase-ring centering.
14. Stage micrometer (0.01 mm divisions).

Sampling

1. Calibrate each personal sampling pump with a representative sampler in line.
2. Fasten the sampler to the worker's lapel as close as possible to the worker's mouth. Remove the top cover from the end of the cowl extension (open face) and orient face down. Wrap the joint between the extender and the monitor's body with shrink tape to prevent air leaks.
3. Submit at least two blanks (or 10 percent of the total samples, whichever is greater) for each set of samples. Remove the caps from the field blank cassettes and store the caps and cassettes in a clean area (bag or box) during the sampling period. Replace the caps in the cassettes when sampling is completed.
4. Sample at 0.5 L/min or greater. Do not exceed 1 mg total dust loading on the filter. Adjust sampling flow rate, Q (L/min), and time to produce a fiber density, E (fibers/mm^2), of 100 to 1,300 fibers/m^2 [3.85 x 10^4 to 5 x 10^5 fibers per 25-mm filter with effective collection area (A_c=385 mm^2)] for optimum counting precision (see step 21 below). Calculate the minimum sampling time, $t_{minimum}$ (min) at the action level (one-half of the current standard), L (f/cc) of the fibrous aerosol being sampled:

$$t_{min} = \frac{(A_c)(E)}{(Q)(L)10^3}$$

5. Remove the field monitor at the end of sampling, replace the plastic top cover and small end caps, and store the monitor.
6. Ship the samples in a rigid container with sufficient packing material to prevent jostling or damage.

Note.—Do not use polyetyrene foam in the shipping container because of electrostatic forces which may cause fiber loss from the sampler filter.

Sample Preparation

Note.—The object is to produce samples with a smooth (nongrainy) background in a medium with a refractive index equal to or less than 1.46. The method below collapses the filter for easier focusing and produces permanent mounts which are useful for quality control and interlaboratory comparison. Other mounting techniques meeting the above criteria may also be used, e.g., the nonpermanent field mounting technique used in P & CAM 239.

7. Ensure that the glass slides and cover slips are free of dust and fibers.
8. Place 40 to 60 ml of acetone into a Guth-type flask. Stopper the flask with a single-hole rubber stopper through which a glass tube extends 5 to 8 cm into the flask. The portion of the glass tube that exits the top of the stopper (8 to 10 cm) is bent downward in an elbow that makes an angle of 20 to 30 degrees with the horizontal.
9. Place the flask in a stirring hotplate or wrap in a heating mantle. Heat the acetone gradually to its boiling temperature (ca. 58 °C).

Caution. The acetone vapor must be generated in a ventilated fume hood away from all open flames and spark sources. Alternate heating methods can be used, providing no open flame or sparks are present.

10. Mount either the whole sample filter or a wedge cut from the sample filter on a clean glass slide.

a. Cut wedges of ca. 25 percent of the filter area with a curved-blade steel surgical knife using a rocking motion to prevent tearing.

b. Place the filter or wedge, dust side up, on the slide. Static electricity will usually keep the filter on the slide until it is cleared.

c. Hold the glass slide supporting the filter approximately 1 to 2 cm from the glass tube port where the acetone vapor is escaping from the heated flask. The acetone vapor stream should cause a condensation spot on the glass slide ca. 2 to 3 cm in diameter. Move the glass slide gently in the vapor stream. The filter should clear in 2 to 5 sec. If the filter curls, distorts, or is otherwise rendered unusable, the vapor stream is probably not strong enough. Periodically wipe the outlet port with tissue to prevent liquid acetone dripping onto the filter.

d. Using the hypodermic syringe with a 22-gauge needle, place 1 to 2 drops of triacetin on the filter. Gently lower a clean 25-mm square cover slip down onto the filter at a slight angle to reduce the possibility of forming bubbles. If too many bubbles form or the amount of triacetin is insufficient, the cover slip may become detached within a few hours.

e. Glue the edges of the cover slip to the glass slide using a lacquer or nail polish.

Note.—If clearing is slow, the slide preparation may be heated on a hotplate (surface temperature 50°C) for 15 min. to hasten clearing. Counting may proceed immediately after clearing and mounting are completed.

Calibration and Quality Control

11. *Calibration of the Walton-Beckett graticule.* The diameter, d_c (mm), of the circular counting area and the disc diameter must be specified when ordering the graticule.

a. Insert any available graticule into the eyepiece and focus so that the graticule lines are sharp and clear.

b. Set the appropriate interpupillary distance and, if applicable, reset the binocular head adjustment so that the magnification remains constant.

c. Install the 40 to 45 X phase objective.

d. Place a stage micrometer on the microscope object stage and focus the microscope on the graduated lines.

e. Measure the magnified grid length, L_o (um), using the stage micrometer.

f. Remove the graticule from the microscope and measure its actual grid length, L_a (mm). This can best be accomplished by using a stage fitted with verniers.

g. Calculate the circle diameter, d_c (mm), for the Walton-Beckett graticule:

$$d_c = \frac{L_a \times D}{L_o}$$

Example: If $L_o = 108$ um, $L_s = 2.93$ mm and $D = 100$ um, then $d_c = 2.71$ mm.

h. Check the field diameter, D(acceptable range 100 mm ±2 mm) with a stage micrometer upon receipt of the graticule from the manufacturer. Determine field area (mm^2).

12. *Microscope adjustments.* Follow the manufacturer's instructions and also the following:

a. Adjust the light source for even illumination across the field of view at the condenser iris.

Note.—Kohler illumination is preferred, where available.

b. Focus on the particulate material to be examined.

c. Make sure that the field iris is in focus, centered on the sample, and open only enough to fully illuminate the field of view.

d. Use the telescope ocular supplied by the manufacturer to ensure that the phase rings (annular diaphragm and phase-shifting elements) are concentric.

13. Check the phase-shift detection limit of the microscope periodically.

a. Remove the HSE/NPL phase-contrast test slide from its shipping container and center it under the phase objective.

b. Bring the blocks of grooved lines into focus.

Note.—The slide consists of seven sets of grooves (ca. 20 grooves to each block) in descending order of visibility from sets 1 to 7. The requirements for counting are that the microscope optics must resolve the grooved lines in set 3 completely, although they may appear somewhat faint, and that the grooved lines in sets 6 to 7 must be invisible. Sets 4 and 5 must be at least partially visible but may vary slightly in visibility between microscopes. A microscope which fails to meet these requirements has either too low or too high a resolution to be used for asbestos counting.

c. If the image quality deteriorates, clean the microscope optics and, if the problem persists, consult the microscope manufacturer.

14. *Quality control of fiber counts.*

a. Prepare and count field blanks along with the field samples. Report the counts on each blank. Calculate the mean of the field blank counts and subtract this value from each sample count before reporting the results.

Note.—The identity of the blank filters should be unknown to the counter until all counts have been completed.

Note.—If a field blank yields fiber counts greater than 7 fibers/100 fields, report possible contamination of the samples.

b. Perform blind recounts by the same counter on 10 percent of filters counted (slides relabeled by a person other than the counter).

15. Use the following test to determine whether a pair of counts on the same filter should be rejected because of possible bias. This statistic estimates the counting repeatability at the 95 percent confidence level. Discard the sample if the difference between the two counts exceeds 2.77 (F)s_r, where F = average of the two fiber counts and s_r = relative standard deviation, which should be derived by each laboratory based on historical in-house data.

Note.—If a pair of counts is rejected as a result of this test, recount the remaining samples in the set and test the new counts against the first counts. Discard all rejected paired counts.

16. Enroll each new counter in a training course that compares performance of counters on a variety of samples using this procedure.

Note.—To ensure good reproducibility, all laboratories engaged in asbestos counting are required to participate in the Proficiency Analytical Testing (PAT) Program and should routinely participate with other asbestos fiber counting laboratories in the exchange of field samples to compare performance of counters.

Measurement

17. Place the slide on the mechanical stage of the calibrated microscope with the center of the filter under the objective lens. Focus the microscope on the plane of the filter.

18. Regularly check phase-ring alignment and Kohler illumination.

19. The following are the counting rules:

a. Count only fibers longer than 5 um. Measure the length of curved fibers along the curve.

b. Count only fibers with a length-to-width ratio equal to or greater than 3:1.

c. For fibers that cross the boundary of the graticule field, do the following:

(1) Count any fiber longer than 5 um that lies entirely within the graticule area.

(2) Count as ½ fiber any fiber with only one end lying within the graticule area.

(3) Do not count any fiber that crosses the graticule boundary more than once.

(4) Reject and do not count all other fibers.

d. Count bundles of fibers as one fiber unless individual fibers can be identified by observing both ends of a fiber.

e. Count enough graticule fields to yield 100 fibers. Count a minimum of 20 fields. Stop at 100 fields regardless of fiber count.

20. Start counting from one end of the filter and progress along a radial line to the other end, shift either up or down on the filter, and continue in the reverse direction. Select fields randomly by looking away from the eyepiece briefly while advancing the mechanical stage. When an agglomerate covers ca. ⅛ or more of the field of view, reject the field and select another. Do not report rejected fields in the number of total fields counted.

Note.—When counting a field, continuously scan a range of focal planes by moving the fine focus knob to detect very fine fibers which have become embedded in the filter. The small-diameter fibers will be very faint but are an important contribution to the total count.

Calculations

21. Calculate and report fiber density on the filter, E (fibers/mm^2); by dividing the total fiber count, F; minus the mean field blank count, B, by the number of fields, n; and the field area, A_f (0.00785 mm^2 for a properly calibrated Walton-Beckett graticule):

$$E = \frac{F - B}{(n)(A_f)} \text{ fibers/mm}^2$$

22. Calculate the concentration, C (f/cc), of fibers in the air volume sampled, V (L), using the effective collection area of the filter, A_c (385 mm^2 for a 25-mm filter):

$$C = \frac{(E)(A_c)}{V(10^3)}$$

Note.—Periodically check and adjust the value of A_c, if necessary.

Appendix C to § 763.121—Qualitative and Quantitative Fit Testing Procedures—Mandatory

Qualitative Fit Test Protocols

I. Isoamyl Acetate Protocol

A. Odor Threshold Screening. 1. Three 1-liter glass jars with metal lids (e.g. Mason or Bell jars) are required.

2. Odor-free water (e.g. distilled or spring water) at approximately 25 °C shall be used for the solutions.

3. The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 cc of pure IAA to 800 cc of odor-free water in a 1-liter jar and shaking for 30 seconds. This solution shall be prepared new at least weekly.

4. The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well ventilated but shall not be connected to the same recirculating ventilation system.

5. The odor test solution is prepared in a second jar by placing 0.4 cc of the stock solution into 500 cc of odor-free water using a clean dropper or pipette. Shake for 30 seconds and allow to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution may be used for only one day.

6. A test blank is prepared in a third jar by adding 500 cc of odor-free water.

7. The odor test and test blank jars shall be labeled 1 and 2 for jar identification. If the labels are put on the lids they can be periodically peeled, dried off and switched to maintain the integrity of the test.

8. The following instructions shall be typed on a card and placed on the table in front of the two test jars (i.e. and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

9. The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

10. If the test subject is unable to identify correctly the jar containing the odor test

solution, the IAA qualitative fit test may not be used.

11. If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

B. Respirator selection. 1. The test subject shall be allowed to pick the most comfortable respirator from a selection including respirators of various sizes from different manufacturers. The selection shall include at least five sizes of elastomeric half facepieces, from at least two manufacturers.

2. The selection process shall be conducted in a room separate from the fit-test chamber to prevent odor fatigue. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine a "comfortable" respirator. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, as it is only a review.

3. The test subject should understand that the employee is being asked to select the respirator which provides the most comfortable fit. Each respirator represents a different size and shape and, if fitted properly and used properly, will provide adequate protection.

4. The test subject holds each facepiece up to the face and eliminates those which obviously do not give a comfortable fit. Normally, selection will begin with a half-mask and if a good fit cannot be found, the subject will be asked to test the full facepiece respirators. (A small percentage of users will not be able to wear any half-mask.)

5. The more comfortable facepieces are noted; the most comfortable mask is donned and *worn at least five minutes* to assess comfort. All donning and adjustments of the facepieces shall be performed by the test subject without assistance from the test conductor or other person. Assistance in assessing comfort can be given by discussing the points of #6 below. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of comfort shall include reviewing the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

- Positioning of mask on nose.
- Room for eye protection.
- Room to talk
- Positioning mask on face and cheeks.

7. The following criteria shall be used to help determine the adequacy of the respirator fit:

- Chin properly placed.
- Strap tension.
- Fit across nose bridge.
- Distance from nose to chin.
- Tendency to slip.
- Self-observation in mirror.

8. The test subject shall conduct the conventional negative and positive-pressure fit checks (e.g. see ANSI Z88.2–1980). Before conducting the negative- or positive-pressure test, the subject shall be told to "seat" the mask by rapidly moving the head from side-to-side and up and down, while taking a few deep breaths.

9. The test subject is now ready for fit testing.

10. After passing the fit test, the test subject shall be questioned again regarding the comfort of the respirator. If it has become uncomfortable, another model of respirator shall be tried.

11. The employee shall be given the opportunity to select a different facepiece and be retested if the chosen facepiece becomes increasingly uncomfortable at any time.

C. Fit test. 1. The fit test chamber shall be similar to a clear 55 gallon drum liner suspended inverted over a 2 foot diameter frame, so that the top of the chamber is about 6 inches above the test subject's head. The inside top center of the chamber shall have a small hook attached.

2. Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors. The cartridges or masks shall be changed at least weekly.

3. After selection, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

4. A copy of the following test exercises and rainbow passage shall be taped to the inside of the test chamber:

Test Exercises

i. Breathe normally.

ii. Breathe deeply. Be certain breaths are *deep* and *regular.*

iii. Turn head all the way from one side to the other. Inhale on each side. Be certain movement is complete. Do not bump the respirator against the shoulders.

iv. Nod head up-and-down. Inhale when head is in the full up position (looking toward ceiling). Be certain motions are complete and made about every second. Do not bump the respirator on the chest.

v. *Talking.* Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

vi. Jogging in place.

vii. Breathe normally.

Rainbow Passage. When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

5. Each test subject shall wear the respirator for at least 10 minutes before starting the fit test.

6. Upon entering the test chamber, the test subject shall be given a 6 inch by 5 inch piece of paper towel or other porous absorbent single ply material, folded in half and wetted with three-quarters of one cc of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber.

7. Allow two minutes for the IAA test concentration to be reached before starting the fit-test exercises. This would be an appropriate time to talk with the test subject, to explain the fit test, the importance of cooperation, the purpose for the head exercises, or to demonstrate some of the exercises.

8. Each exercise described in #4 above shall be performed for at least one minute.

9. If at any time during the test, the subject detects the banana-like odor of IAA, the test has failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

10. If the test is failed, the subject shall return to the selection room and remove the respirator, repeat the odor sensitivity test, select and put on another respirator, return to the test chamber, and again begin the procedure described in the c(4) through c(8) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait about 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

11. If a person cannot pass the fit test described above wearing a half-mask respirator from the available selection, full facepiece models must be used.

12. When a respirator is found that passes the test, the subject breaks the faceseal and takes a breath before exiting the chamber. This is to assure that the reason the test subject is not smelling the IAA is the good fit of the respirator facepiece seal and not olfactory fatigue.

13. When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test. To keep the area from becoming contaminated, the used towels shall be kept in a self-sealing bag so there is no significant IAA concentration buildup in the test chamber during subsequent tests.

14. At least two facepieces shall be selected for the IAA test protocol. The test subject shall be given the opportunity to wear them for one week to choose the one which is more comfortable to wear.

15. Persons who have successfully passed this fit test with a half-mask respirator may be assigned the use of the test respirator in atmospheres with up to 10 times the PEL of airborne asbestos. In atmospheres greater than 10 times, and less than 100 times the PEL (up to 100 ppm), the subject must pass the IAA test using a full face negative pressure respirator. (The concentration of the IAA inside the test chamber must be increased by ten times for QLFT of the full facepiece.)

16. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

17. If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied air respirator, or self-contained breathing apparatus.

18. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respirator diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

19. Qualitative fit testing shall be repeated at least every six months.

20. In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(1) Weight change of 20 pounds or more,

(2) Significant facial scarring in the area of the facepiece seal.

(3) Significant dental changes; i.e., multiple extractions without prothesis, or acquiring dentures.

(4) Reconstructive or cosmetic surgery, or

(5) Any other condition that may interfere with facepiece sealing.

D. Recordkeeping. A summary of all test results shall be maintained in each office for 3 years. The summary shall include:

(1) Name of test subject.

(2) Date of testing.

(3) Name of the test conductor.

(4) Respirators selected (indicate manufacturer, model, size and approval number).

(5) Testing agent.

II. Saccharin Solution Aerosol Protocol

A. Respirator selection. Respirators shall be selected as described in section IB (respirator selection) above, except that each respirator shall be equipped with a particulate filter.

B. Taste threshold screening. 1. An enclosure about head and shoulders shall be used for threshold screening (to determine if the individual can taste saccharin) and for fit testing. The enclosure shall be approximately 12 inches in diameter by 14 inches tall with at least the front clear to allow free movement of the head when a respirator is worn.

2. The test enclosure shall have a three-quarter inch hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

3. The entire screening and testing procedure shall be explained to the test subject prior to conducting the screening test.

4. During the threshold screening test, the test subject shall don the test enclosure and breathe with mouth open with tongue extended.

5. Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. This nebulizer shall be clearly marked to distinquish it from the fit test solution nebulizer.

6. The threshold check solution consists of 0.83 gram of sodium saccharin, USP in water. It can be prepared by putting 1 cc of the test solution (see C.7 below) in 100 cc of water.

7. To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then is released and allowed to expand fully.

8. Ten squeezes of the nebulizer bulb are repeated rapidly and then the test subject is asked whether the saccharin can be tasted.

9. If the first response is negative, ten more squeezes of the nebulizer bulb are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

10. If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

11. The test conductor will take note of the number of squeezes required to elicit a taste response.

12. If the saccharin is not tasted after 30 squeezes (Step 10), the saccharin fit test cannot be performed on the test subject.

13. If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

14. Correct use of the nebulizer means that approximately 1 cc of liquid is used at a time in the nebulizer body.

15. The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least every four hours.

C. Fit Test. 1. The test subject shall don and adjust the respirator without assistance from any person.

2. The fit test uses the same enclosure described in IIB above.

3. Each test subject shall wear the respirator for at least 10 minutes before starting the fit test.

4. The test subject shall don the enclosure while wearing the respirator selected in section IB above. This respirator shall be properly adjusted and equipped with a particulate filter.

5. The test subject may not eat, drink (except plain water), or chew gum for 15 minutes before the test.

6. A second DeVilbiss Model 40 Inhalation Medication Nebulizer is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinquish it from the screening test solution nebulizer.

7. The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 cc of warm water.

8. As before, the test subject shall breathe with mouth open and tongue extended.

9. The nebulizer is inserted into the hole in the front of the enclosure and the fit test solution is sprayed into the enclosure using the same technique as for the taste threshold screening and the same number of squeezes required to elicit a taste response in the screening. (See B.8 through B.10 above).

10. After generation of the aerosol, read the following instructions to the test subject. The test subject shall perform the exercises for one minute each.

i. Breathe normally.

ii. Breathe deeply. Be certain breaths are *deep* and *regular.*

iii. Turn head all the way from one side to the other. Be certain movement is complete. Inhale on each side. Do not bump the respirator against the shoulders.

iv. Nod head up-and-down. Be certain motions are complete. Inhale when head is in the full up position (when looking toward the ceiling). Do not bump the respirator on the chest.

v. *Talking.* Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

vi. Jogging in place.

vii. Breathe normally.

Rainbow Passage. When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

11. At the beginning of each exercise, the aerosol concentration shall be replenished using one-half the number of squeezes as initially described in C.9.

12. The test subject shall indicate to the test conductor, if at any time during the fit test, the taste of saccharin is detected.

13. If the saccharin is detected, the fit is deemed unsatisfactory and a different respirator shall be tried.

14. At least two facepieces shall be selected by the IAA test protocol. The test subject shall be given the opportunity to wear them for one week to choose the one which is more comfortable to wear.

15. Successful completion of the test protocol shall allow the use of the half mask tested respirator in contaminated atmospheres up to 10 times the PEL of asbestos. In other words this protocol may be used to assign protection factors no higher than ten.

16. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

17. If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied air respirator, or self-contained breathing apparatus.

18. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respirator diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

19. Qualitative fit testing shall be repeated at least every six months.

20. In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(1) Weight change of 20 pounds or more,

(2) Significant facial scarring in the area of the facepiece seal,

(3) Significant dental changes; i.e., multiple extractions without prothesis, or acquiring dentures,

(4) Reconstructive or cosmetic surgery, or

(5) Any other condition that may interfere with facepiece sealing.

D. Recordkeeping. A summary of all test results shall be maintained in each office for 3 years. The summary shall include:

(1) Name of test subject.

(2) Date of testing.

(3) Name of test conductor.

(4) Respirators selected (indicate manufacturer, model, size and approval number).

(5) Testing agent.

III. Irritant Fume Protocol

A. Respirator selection. Respirators shall be selected as described in section IB above, except that each respirator shall be equipped with a combination of high-efficiency and acid-gas cartridges.

B. Fit test. 1. The test subject shall be allowed to smell a weak concentration of the irritant smoke to familiarize the subject with the characteristic odor.

2. The test subject shall properly don the respirator selected as above, and wear it for at least 10 minutes before starting the fit test.

3. The test conductor shall review this protocol with the test subject before testing.

4. The test subject shall perform the conventional positive pressure and negative pressure fit checks (see ANSI Z88.2 1980). Failure of either check shall be cause to select an alternate respirator.

5. Break both ends of a ventilation smoke tube containing stannic oxychloride, such as the MSA part #5645, or equivalent. Attach a short length of tubing to one end of the smoke tube. Attach the other end of the smoke tube to a low pressure air pump set to deliver 200 milliliters per minute.

6. Advise the test subject that the smoke can be irritating to the eyes and instruct the subject to keep the eyes closed while the test is performed.

7. The test conductor shall direct the stream of irritant smoke from the tube towards the faceseal area of the test subject. The person conducting the test shall begin with the tube at least 12 inches from the facepiece and gradually move to within one inch, moving around the whole perimeter of the mask.

8. The test subject shall be instructed to do the following exercises while the respirator is being challenged by the smoke. Each exercise shall be performed for one minute.

i. Breathe normally.

ii. Breathe deeply. Be certain breaths are *deep* and *regular.*

iii. Turn head all the way from one side to the other. Be certain movement is complete. Inhale on each side. Do not bump the respirator against the shoulders.

iv. Nod head up-and-down. Be certain motions are complete and made every second. Inhale when head is in the full up position (looking toward ceiling). Do not bump the respirator against the chest.

v. *Talking.* Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

Rainbow Passage. When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

vi. Jogging in place.

vii. Breathe normally.

9. The test subject shall indicate to the test conductor if the irritant smoke is detected. If smoke is detected, the test conductor shall stop the test. In this case, the tested respirator is rejected and another respirator shall be selected.

10. Each test subject passing the smoke test (i.e. without detecting the smoke) shall be given a sensitivity check of smoke from the same tube to determine if the test subject reacts to the smoke. Failure to evoke a response shall void the fit test.

11. Steps B4, B9, B10 of this fit test protocol shall be performed in a location with exhaust ventilation sufficient to prevent general contamination of the testing area by the test agents.

12. At least two facepieces shall be selected by the IAA test protocol. The test subject shall be given the opportunity to wear them for one week to choose the one which is more comfortable to wear.

13. Respirators successfully tested by the protocol may be used in contaminated atmospheres up to ten times the PEL of asbestos.

14. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

15. If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied air respirator, or self-contained breathing apparatus.

16. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respirator diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

17. Qualitative fit testing shall be repeated at least every six months.

18. In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(1) Weight change of 20 pounds or more,

(2) Significant facial scarring in the area of the facepiece seal,

(3) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures,

(4) Reconstructive or cosmetic surgery, or

(5) Any other condition that may interfere with facepiece sealing.

C. Recordkeeping. A summary of all test results shall be maintained in each office for 3 years. The summary shall include:

(1) Name of test subject.

(2) Date of testing.

(3) Name of test conductor.

(4) Respirators selected (indicate manufacturer, model, size and approval number).

(5) Testing agent.

Quantitative Fit Test Procedures

1. General

a. The method applies to the negative-pressure nonpowered air-purifying respirators only.

b. The employer shall assign one individual who shall assume the full responsibility for implementing the respirator quantitative fit test program.

2. Definitions

a. "Quantitative Fit Test" means the measurement of the effectiveness of a respirator seal in excluding the ambient atmosphere. The test is performed by dividing the measured concentration of challenge agent in a test chamber by the measured concentration of the challenge agent inside the respirator facepiece when the normal air purifying element has been replaced by an essentially perfect purifying element.

b. "Challenge Agent" means the air contaminant introduced into a test chamber so that its concentration inside and outside the respirator may be compared.

c. "Test Subject" means the person wearing the respirator for quantitative fit testing.

d. "Normal Standing Position" means standing erect and straight with arms down along the sides and looking straight ahead.

e. "Fit Factor" means the ratio of challenge agent concentration outside with respect to the inside of a respirator inlet covering (facepiece or enclosure).

3. Apparatus

a. *Instrumentation.* Corn oil, sodium chloride or other appropriate aerosol generation, dilution, and measurement systems shall be used for quantitative fit test.

b. *Test chamber.* The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without distributing the challenge agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the challenge agent is effectively isolated from the ambient air yet uniform in concentration throughout the chamber.

c. When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high-efficiency particular filter supplied by the same manufacturer.

d. The sampling instrument shall be selected so that a strip chart record may be made of the test showing the rise and fall of challenge agent concentration with each inspiration and expiration at fit factors of at least 2,000.

e. The combination of substitute air-purifying elements (if any), challenge agent, and challenge agent concentration in the test chamber shall be such that the test subject is

not exposed in excess of PEL to the challenge agent at any time during the testing process.

f. The sampling port on the test specimen respirator shall be placed and constructed so that there is no detectable leak around the port, a free air flow is allowed into the sampling line at all times and so there is no interference with the fit or performance of the respirator.

g. The test chamber and test set-up shall permit the person administering the test to observe one test subject inside the chamber during the test.

h. The equipment generating the challenge atmosphere shall maintain the concentration of challenge agent constant within a 10 percent variation for the duration of the test.

i. The time lag (interval between an event and its being recorded on the strip chart) of the instrumentation may not exceed 2 seconds.

j. The tubing for the test chamber atmosphere and for the respirator sampling port shall be the same diameter, length and material. It shall be kept as short as possible. The smallest diameter tubing recommended by the manufacturer shall be used.

k. The exhaust flow from the test chamber shall pass through a high-efficiency filter before release to the room.

l. When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.

4. Procedural Requirements

a. The fitting of half-mask respirators should be started with those having multiple sizes and a variety of interchangeable cartridges and canisters such as the MSA Comfo II-M, Norton M, Survivair M, A–O M, or Scott–M. Use either of the tests outlined below to assure that the facepiece is properly adjusted.

(1) *Positive pressure test.* With the exhaust port(s) blocked, the negative pressure of slight inhalation should remain constant for several seconds.

(2) *Negative pressure test.* With the intake port(s) blocked, the negative pressure slight inhalation should remain constant for several seconds.

b. After a facepiece is adjusted, the test subject shall wear the facepiece for at least 5 minutes before conducting a qualitative test by using either of the methods described below and using the exercise regime described in 5.a., b., c., d. and e.

(1) *Isoamyl acetate test.* When using organic vapor cartridges, the test subject who can smell the odor should be unable to detect the odor of isoamyl acetate squirted into the air near the most vulnerable portions of the facepiece seal. In a location which is separated from the test area, the test subject shall be instructed to close her/his eyes during the test period. A combination cartridge or canister with organic vapor and high-efficiency filters shall be used when available for the particular mask being tested. The test subject shall be given an opportunity to smell the odor of isoamyl acetate before the test is conducted.

(2) *Irritant fume test.* When using high-efficiency filters, the test subject should be unable to detect the odor of irritant fume (stannic chloride or titanium tetrachloride ventilation smoke tubes) squirted into the air near the most vulnerable portions of the facepiece seal. The test subject shall be instructed to close her/his eyes during the test period.

c. The test subject may enter the quantitative testing chamber only if she or he has obtained a satisfactory fit as stated in 4.b. of this Appendix.

d. Before the subject enters the test chamber, a reasonably stable challenge agent concentration shall be measured in the test chamber.

e. Immediately after the subject enters the test chamber, the challenge agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half-mask and 1 percent for a full facepiece.

f. A stable challenge agent concentration shall be obtained prior to the actual start of testing.

g. Respirator restraining straps may not be overtightened for testing. The straps shall be adjusted by the wearer to give a reasonably comfortable fit typical of normal use.

5. *Exercise Regime.*

Prior to entering the test chamber, the test subject shall be given complete instructions as to her/his part in the test procedures. The test subject shall perform the following exercises, in the order given, for each independent test.

a. *Normal Breathing (NB).* In the normal standing position, without talking, the subject shall breathe normally for at least one minute.

b. *Deep Breathing (DB).* In the normal standing position the subject shall do deep breathing for at least one minute pausing so as not to hyperventilate.

c. *Turning head side to side (SS).* Standing in place the subject shall slowly turn his/her head from side between the extreme positions to each side. The head shall be held at each extreme position for at least 5 seconds. Perform for at least three complete cycles.

d. *Moving head up and down (UD).* Standing in place, the subject shall slowly move his/her head up and down between the extreme position straight up and the extreme position straight down. The head shall be held at each extreme position for at least 5 seconds. Perform for at least three complete cycles.

e. *Reading (R).* The subject shall read out slowly and loudly so as to be heard clearly by the test conductor or monitor. The test subject shall read the "rainbow passage" at the end of this section.

f. *Grimace (G).* The test subject shall grimace, smile, frown, and generally contort the face using the facial muscles. Continue for at least 15 seconds.

g. *Bend over and touch toes (B).* The test subject shall bend at the waist and touch toes and return to upright position. Repeat for at least 30 seconds.

h. *Jogging in place (J).* The test subject shall perform jog in place for at least 30 seconds.

i. *Normal Breathing (NB).* Same as exercise a.

Rainbow Passage. When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

6. Termination of Test

The test shall be terminated whenever any single peak penetration exceeds 5 percent for halfmasks and 1 percent for full facepieces. The test subject may be refitted and retested. If two of the three required tests are terminated, the fit shall be deemed inadequate. (See paragraph 4.h.).

7. Calculation of Fit Factors

a. The fit factor determined by the quantitative fit test equals the average concentration inside the respirator.

b. The average test chamber concentration is the arithmetic average of the test chamber concentration at the beginning and the end of the test.

c. The average peak concentration of the challenge agent inside the respirator shall be the arithmetic average peak concentrations for each of the nine exercises of the test which are computed as the arithmetic average of the peak concentrations found for each breath during the exercise.

d. The average peak concentration for an exercise may be determined graphically if there is not a great variation in the peak concentrations during a single exercise.

8. Interpretation of Test Results

The fit factor measured by the quantitative fit testing shall be the lowest of the three protection factors resulting from three independent tests.

9. Other Requirements

a. The test subject shall not be permitted to wear a halfmask or full facepiece mask if the minimum fit factor of 100 or 1,000, respectively, cannot be obtained. If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied air respirator, or self-contained breathing apparatus.

b. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

c. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respirator diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

d. The test subject shall be given the opportunity to wear the assigned respirator for one week. If the respirator does not provide a satisfactory fit during actual use, the test subject may request another QNFT which shall be performed immediately.

e. A respirator fit factor card shall be issued to the test subject with the following information:

(1) Name.

(2) Date of fit test.

(3) Protection factors obtained through each manufacturer, model and approval number of respirator tested.

(4) Name and signature of the person that conducted the test.

f. Filters used for qualitative or quantitative fit testing shall be replaced weekly, whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media. Organic vapor cartridges/canisters shall be replaced daily or sooner if there is any indication of breakthrough by the test agent.

10. Retesting

In addition, because the sealing of the respirator may be affected, quantitative fit testing shall be repeated immediately when the test subject has a:

a. Weight change of 20 pounds or more,

b. Significant facial scarring in the area of the facepiece seal,

c. Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures,

d. Reconstructive or cosmetic surgery, or

e. Any other condition that may interfere with facepiece sealing.

11. Recordkeeping

A summary of all test results shall be maintained for 3 years. The summary shall include:

a. Name of test subject.

b. Date of testing.

c. Name of the test conductor.

d. Fit factors obtained from every respirator tested (indicate manufacturer, model, size and approval number).

Appendix D to § 763.121—Medical Questionnaires—Mandatory

This mandatory appendix contains the medical questionnaires that must be administered to all employees who are exposed to asbestos above the action level, and who will therefore be included in their employer's medical surveillance program. Part 1 of the appendix contains the Initial Medical Questionnaire, which must be obtained for all new hires who will be covered by the medical surveillance requirements. Part 2 includes the abbreviated Periodical Medical Questionnaire, which must be administered to all employees who are provided periodic medical examinations under the medical surveillance provisions of the standard.

BILLING CODE 6560-50-M

Part 1
INITIAL MEDICAL QUESTIONNAIRE

1. NAME _____

2. SOCIAL SECURITY # ___ ___ ___ ___ ___ ___ ___ ___ ___
(1 2 3 4 5 6 7 8 9)

3. CLOCK NUMBER ___ ___ ___ ___ ___ ___
(10 11 12 13 14 15)

4. PRESENT OCCUPATION _____

5. PLANT _____

6. ADDRESS _____

7. _____
(Zip Code)

8. TELEPHONE NUMBER _____

9. INTERVIEWER _____

10. DATE _____ ___ ___ ___ ___ ___ ___
(16 17 18 19 20 21)

11. Date of Birth _____ ___ ___ ___ ___ ___ ___
Month Day Year (22 23 24 25 26 27)

12. Place of Birth _____

13. Sex
1. Male ___
2. Female ___

14. What is your marital status?
1. Single ___
2. Married ___
3. Widowed ___
4. Separated/ Divorced ___

15. Race
1. White ___
2. Black ___
3. Asian ___
4. Hispanic ___
5. Indian ___
6. Other ___

16. What is the highest grade completed in school? _____
(For example 12 years is completion of high school)

OCCUPATIONAL HISTORY

17A. Have you ever worked full time (30 hours per week or more) for 6 months or more? 1. Yes ___ 2. No ___

IF YES TO 17A:

B. Have you ever worked for a year or more in any dusty job? 1. Yes ___ 2. No ___ 3. Does Not Apply ___

Specify job/industry _____ Total Years Worked ___

Was dust exposure: 1. Mild ___ 2. Moderate ___ 3. Severe ___

C. Have you even been exposed to gas or chemical fumes in your work? 1. Yes ___ 2. No ___
Specify job/industry _____ Total Years Worked ___

Was exposure: 1. Mild ___ 2. Moderate ___ 3. Severe ___

D. What has been your usual occupation or job--the one you have worked at the longest?

1. Job occupation _____

2. Number of years employed in this occupation _____

3. Position/job title _____

4. Business, field or industry _____

(Record on lines the years in which you have worked in any of these industries, e.g., 1960-1969).
Have you ever worked:

	YES	NO
E. In a mine?.....	☐	☐
F. In a quarry?.....	☐	☐
G. In a foundry?.....	☐	☐
H. In a pottery?.....	☐	☐
I. In a cotton, flax or hemp mill?.....	☐	☐
J. With asbestos, tremolite, anthophyllite, or actinolite?.....	☐	☐

18. PAST MEDICAL HISTORY

	YES	NO
A. Do you consider yourself to be in good health?	☐	☐

If "NO" state reason _____

B. Have you any defect of vision?..... |___| |___|

If "YES" state nature of defect_____

C. Have you any hearing defect?..... |___| |___|

If "YES" state nature of defect_____

D. Are you suffering from or have you ever suffered from:

a. Epilepsy (or fits, seizures, convulsions)? |___| |___|

b. Rheumatic fever? |___| |___|

c. Kidney disease? |___| |___|

d. Bladder disease? |___| |___|

e. Diabetes? |___| |___|

f. Jaundice? |___| |___|

19. CHEST COLDS AND CHEST ILLNESSES

19A. If you get a cold, does it usually go to your chest? (Usually means more then 1/2 the time) 1. Yes ___ 2. No ___ 3. Don't get colds___

20A. During the past 3 years, have you had any chest illnesses that have kept you off work, indoors at home, or in bed? 1. Yes ___ 2. No ___

IF YES TO 20A:

B. Did you produce phlegm with any of these chest illness? 1. Yes ___ 2. No ___ 3. Does not apply ___

C. In the last 3 years, how many illnesses with (increased) phlegm did you have which lasted a week or more? Number of illnesses ___ No such illnesses ___

21. Did you have any lung trouble before the age of 16? 1. Yes ___ 2. No ___

22. Have you ever had any of the following?

1A. Attacks of bronchitis? 1. Yes ___ 2. No ___

IF YES TO 1A:

B. Was it confirmed by a doctor? 1. Yes ___ 2. No ___ 3. Does not apply ___

C. At what age was your first attack? Age in Years ___ Does not apply ___

2A. Pneumonia (including bronchopneumonia)? 1. Yes ___ 2. No ___

IF YES TO 2A:

B. Was it confirmed by a doctor? 1. Yes ___ 2. No ___ 3. Does Not Apply ___

C. At what age did you first have it? Age in Years ___ Does Not Apply ___

3A. Hay Fever? 1. Yes ___ 2. No ___

IF YES TO 3A:

B. Was it confirmed by a doctor? 1. Yes ___ 2. No ___ 3. Does Not Apply ___

C. At what age did it start? Age in Years ___ Does Not Apply ___

23A. Have you ever had chronic bronchitis? 1. Yes ___ 2. No ___

IF YES TO 23A:

B. Do you still have it? 1. Yes ___ 2. No ___ 3. Does Not Apply ___

C. Was it confirmed by a doctor? 1. Yes ___ 2. No ___ 3. Does Not Apply ___

D. At what age did it start? Age in Years ___ Does Not Apply ___

24A. Have you ever had emphysema? 1. Yes ___ 2. No ___

IF YES TO 24A:

B. Do you still have it? 1. Yes ___ 2. No ___ 3. Does Not Apply ___

C. Was it confirmed by a doctor? 1. Yes ___ 2. No ___ 3. Does Not Apply ___

D. At what age did it start? Age in Years ___ Does Not Apply ___

25A. Have you ever had asthma? 1. Yes ___ 2. No ___

IF YES TO 25A:

B. Do you still have it? 1. Yes ___ 2. No ___ 3. Does Not Apply ___

C. Was it confirmed by a doctor? 1. Yes ___ 2. No ___ 3. Does Not Apply ___

D. At what age did it start? Age in Years ___ Does Not Apply ___

E. If you no longer have it, at what age did it stop? Age Stopped ___ Does Not Apply ___

26. Have you ever had:

A. Any other chest illness? 1. Yes ___ 2. No ___
If yes, please specify _____

B. Any chest operations? 1. Yes ___ 2. No ___
If yes, please specify _____

C. Any chest injuries? 1. Yes ___ 2. No ___
If yes, please specify _____

27A. Has a doctor ever told you that you had heart trouble? 1. Yes ___ 2. No ___

IF YES TO 27A:

B. Have you ever had treatment for heart trouble in the past 10 years? 1. Yes ___ 2. No ___ 3. Does Not Apply ___

28A. Has a doctor ever told you that you had high blood pressure? 1. Yes ___ 2. No ___

IF YES TO 28A:

B. Have you had any treatment for high blood pressure (hypertension) in the past 10 years? 1. Yes ___ 2. No ___ 3. Does Not Apply ___

29. When did you last have your chest X-rayed? (Year) ___ ___ ___ ___
25 26 27 28

30. Where did you last have your chest X-rayed (if known) _____

What was the outcome? _____

FAMILY HISTORY

31. Were either of your natural parents ever told by a doctor that they had a chronic lung conditions such as:

	Father			Mother		
	1. Yes	2. No	3. Don't Know	1. Yes	2. No	3. Don't Know
A. Chronic Bronchitis?	___	___	___	___	___	___
B. Emphysema?	___	___	___	___	___	___
C. Asthma?	___	___	___	___	___	___

	Father 1. Yes	2. No	3. Don't Know	Mother 1. Yes	2. No	3. Don't Know
D. Lung cancer?	___	___	___	___	___	___
E. Other chest conditions	___	___	___	___	___	___
F. Is parent currently alive?	___	___	___	___	___	___
G. Please Specify	___ Age if Living ___ Age at Death ___ Don't Know			___ Age if Living ___ Age at Death ___ Don't Know		
H. Please specify cause of death	_____			_____		

COUGH

32A. Do you usually have a cough? (Count a cough with first smoke or on first going out of doors. Exclude clearing of throat.) [If no, skip to question 32C.] 1. Yes ___ 2. No ___

B. Do you usually cough as much as 4 to 6 times a day 4 or more days out of the week? 1. Yes ___ 2. No ___

C. Do you usually cough at all on getting up or first thing in the morning? 1. Yes ___ 2. No ___

D. Do you usually cough at all during the rest of the day or at night? 1. Yes ___ 2. No ___

IF YES TO ANY OF ABOVE (32A, B, C, OR D), ANSWER THE FOLLOWING. IF NO TO ALL, CHECK DOES NOT APPLY AND SKIP TO NEXT PAGE

E. Do you usually cough like this on most days for 3 consecutive months or more during the year? 1. Yes ___ 2. No ___ 3. Does not apply ___

F. For how many years have you had the cough? Number of Years ___ Does not apply ___

33A. Do you usually bring up phlegm from your chest? (Count phlegm with the first smoke or on first going out of doors. Exclude phlegm from the nose. Count swallowed phlegm.) (If no, skip to 33C) 1. Yes ___ 2. No ___

B. Do you usually bring up phlegm like this as much as twice a day 4 or more days out of the week? 1. Yes ___ 2. No ___

C. Do you usually bring up phlegm at all on getting up or first thing in the morning? 1. Yes ___ 2. No ___

D.	Do you usually bring up phlegm at all during the rest of the day or at night?	1. Yes ___ 2. No ___

IF YES TO ANY OF THE ABOVE (33A, B, C, OR D), ANSWER THE FOLLOWING:
IF NO TO ALL, CHECK DOES NOT APPLY AND SKIP TO 34A.

E.	Do you bring up phlegm like this on most days for 3 consecutive months or more during the year?	1. Yes ___ 2. No ___ 3. Does not apply ___
F.	For how many years have you had trouble with phlegm?	Number of years ___ Does not apply ___

EPISODES OF COUGH AND PHLEGM

34A.	Have you had periods of episodes of (increased*) cough and phlegm lasting for 3 weeks or more each year? *(For persons who usually have cough and/or phlegm)	1. Yes ___ 2. No ___
	If YES to 34A	
B.	For how long have you had at least 1 such episode per year?	Number of years ___ Does not apply ___

WHEEZING

35A.	Does your chest ever sound wheezy or whistling	
	1. When you have a cold?	1. Yes ___ 2. No ___
	2. Occasionally apart from colds?	1. Yes ___ 2. No ___
	3. Most days or nights?	1. Yes ___ 2. No ___
	IF YES TO 1, 2, OR 3 IN 35A	
B.	For how many years has this been present?	Number of years ___ Does not apply ___
36A.	Have you ever had an attack of wheezing that has made you feel short of breath?	1. Yes ___ 2. No ___
	IF YES TO 36A	
B.	How old were you when you had your first such attack?	Age in years ___ Does not apply ___
C.	Have you had 2 or more such episodes?	1. Yes ___ 2. No ___ 3. Does not apply ___
D.	Have you ever required medicine or treatment for the(se) attack(s)?	1. Yes ___ 2. No ___ 3. Does not apply ___

BREATHLESSNESS

37. If disabled from walking by any condition other than heart or lung disease, please describe and proceed to question 39A.
Nature of condition(s) _____

38A. Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill? 1. Yes ___ 2. No ___

IF YES TO 38 A

B. Do you have to walk slower than people of your age on the level because of breathlessness? 1. Yes ___ 2. No ___ 3. Does not apply ___

C. Do you ever have to step for breath when walking at your own pace on the level? 1. Yes ___ 2. No ___ 3. Does not apply ___

D. Do you ever have to stop for breath after walking about 100 yards (or after a few minutes) on the level? 1. Yes ___ 2. No ___ 3. Does not apply ___

E. Are you too breathless to leave the house or breathless on dressing or climbing one flight of stairs? 1. Yes ___ 2. No ___ 3. Does not apply ___

TOBACCO SMOKING

39A. Have you ever smoked cigarettes? (No means less than 20 packs of cigarettes or 12 oz. of tobacco in a lifetime or less than 1 cigarette a day for 1 year). 1. Yes ___ 2. No ___

IF YES TO 39A

B. Do you now smoke cigarettes (as of one months ago) 1. Yes ___ 2. No ___ 3. Does not apply ___

C. How old were you when you first started regular cigarette smoking? Age in years ___ Does not apply ___

D. If you have stopped smoking cigarettes completely, how old were you when you stopped? Age stopped ___ Check if still smoking ___ Does not apply ___

E. How many cigarettes do you smoke per day now? Cigarettes per day ___ Does not apply ___

F. On the average of the entire time you smoked, how many cigarettes did you smoke per day? Cigarettes per day ___ Does not apply ___

G. Do or did you inhale the cigarette smoke?

1. Does not apply
2. Not at all ___
3. Slightly ___
4. Moderately ___
5. Deeply ___
___

40A. Have you ever smoked a pipe regularly? (Yes means more than 12 oz. of tobacco in a lifetime.)

1. Yes ___ 2. No ___

IF YES TO 40A:

FOR PERSONS WHO HAVE EVER SMOKED A PIPE

B. 1. How old were you when you started to smoke a pipe regularly?

Age ___

2. If you have stopped smoking a pipe completely, how old were you when you stopped?

Age stopped ___ ___
Check if still smoking a pipe ___
Does not apply ___ ___

C. On the average over the entire time you smoked a pipe, how much pipe tobacco did you smoke per week?

___ oz. per week (a standard pouch of tobacco contains 1 1/2 oz.)
___ Does not apply

D. How much pipe tobacco are you smoking now?

oz. per week ___
Not currently smoking a pipe

E. Do you or did you inhale the pipe smoke?

1. Never smoked
2. Not at all ___
3. Slightly ___
4. Moderately ___
5. Deeply ___
___

41A. Have you ever smoked cigars regularly? (Yes means more than 1 cigar a week for a year)

1. Yes ___ 2. No ___

IF YES TO 41A

FOR PERSONS WHO HAVE EVER SMOKED CIGARS

B. 1. How old were you when you started smoking cigars regularly?

Age ___

2. If you have stopped smoking cigars completely, how old were you when you stopped?

Age stopped ___
Check if still smoking cigars ___
Does not apply ___
___

C. On the average over the entire time you smoked cigars, how many cigars did you smoke per week?

Cigars per week ___
Does not apply ___
___

D. How many cigars are you smoking per week now?

Cigars per week ___
Check if not smoking cigars currently ___

E. Do or did you inhale the cigar smoke?

1. Never smoked ___
2. Not at all ___
3. Slightly ___
4. Moderately ___
5. Deeply ___

Signature _____ Date _____

Part 2
PERIODIC MEDICAL QUESTIONNAIRE

1. NAME _____

2. SOCIAL SECURITY # ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
1 2 3 4 5 6 7 8 9

3. CLOCK NUMBER ___ ___ ___ ___ ___ ___ ___
10 11 12 13 14 15

4. PRESENT OCCUPATION _____

5. PLANT _____

6. ADDRESS _____

7. _____
(Zip Code)

8. TELEPHONE NUMBER _____

9. INTERVIEWER _____

10. DATE _____ ___ ___ ___ ___ ___ ___ ___
16 17 18 19 20 21

11. What is your marital status? 1. Single ___ 2. Married ___ 3. Widowed ___ 4. Separated/Divorced ___

12. OCCUPATIONAL HISTORY

12A. In the past year, did you work full time (30 hours per week or more) for 6 months or more? 1. Yes ___ 2. No ___

12B. IF YES TO 12A:

In the past year, did you work in a dusty job? 1. Yes ___ 2. No ___ 3. Does not apply ___

12C. Was dust exposure: 1. Mild ___ 2. Moderate ___ 3. Severe ___

12D. In the past year, were you exposed to gas or chemical fumes in your work? 1. Yes ___ 2. No ___

12E. Was exposure: 1. Mild ___ 2. Moderate ___ 3. Severe ___

12F. In the past year, what was your: 1. Job/occupation? _____ 2. Position/job title? _____

13. RECENT MEDICAL HISTORY

13A. Do you consider yourself to be in good health? Yes ____ No ____

If NO, state reason _____

13B. In the past year, have you developed:

	Yes	No
Epilepsy?	___	___
Rheumatic fever?	___	___
Kidney disease?	___	___
Bladder disease?	___	___
Diabetes?	___	___
Jaundice?	___	___
Cancer?	___	___

14. CHEST COLDS AND CHEST ILLNESSES

14A. If you get a cold, does it usually go to your chest? (Usually means more than 1/2 the time)

1. Yes ___ No ___
3. Don't get colds ___

15A. During the past year, have you had any chest illnesses that have kept you off work, indoors at home, or in bed?

1. Yes ___ 2. No ___
3. Does not apply ___

IF YES TO 15A:

15B. Did you produce phlegm with any of these chest illnesses

1. Yes ___ 2. No ___
3. Does not apply ___

15C. In the past year, how many such illnesses with (increased) phlegm did you have which lasted a week or more?

Number of illnesses ___
No such illnesses ___

16. RESPIRATORY SYSTEM

In the past year have you had:

	Yes or No	Further Comment on Positive Answers
Asthma	_____	
Bronchitis	_____	
Hay Fever	_____	
Other Allergies	_____	

	Yes or No	Further Comment on Positive Answers
Pneumonia	_____	
Tuberculosis	_____	
Chest Surgery	_____	
Other Lung Problems	_____	
Heart Disease	_____	
Do you have:		
Frequent colds	_____	
Chronic cough	_____	
Shortness of breath when walking or climbing one flight of stairs	_____	
Do you:		
Wheeze	_____	
Cough up phlegm	_____	
Smoke cigarettes	_____	Packs per day ___ How many years ___

Date _____ Signature _____

BILLING CODE 6560-50-C

Appendix E to § 763.121—Interpretation and Classification of Chest Roentgenograms—Mandatory

(a) Chest roentgenograms shall be interpreted and classified in accordance with a professionally accepted classification system and recorded on a Roentgenographic Interpretation Form. Form CSD/NIOSH (M) 2.8.

(b) Roentgenograms shall be interpreted and classified only by a B-reader, a board eligible/certified radiologist, or an experienced physician with known expertise in pneumoconioses.

(c) All interpreters, whenever interpreting chest roentgenograms made under this section, shall have immediately available for reference a complete set of the ILO–U/C International Classification of Radiographs for Pneumoconioses, 1980.

§ 763.122 Exclusions for States.

(a) The States of Idaho, Kansas, Oklahoma, and Wisconsin have 6 months or such other reasonable time as suggested by the particular State and approved by the Director of the Office of Toxic Substances to make their regulations comparable to or more stringent than this part, and to submit their regulations to EPA's Office of Toxic Substances for review. If in such reasonable time after March 27, 1987, any of these States have not so revised their regulations and submitted them to EPA, State and local government employees in such States shall be covered by the requirements of this part.

(b) Any other State that wishes to be excluded from this rule shall send a copy of a regulation which it considers to be comparable to or more stringent than this part to EPA's Office of Toxic Substances for review. EPA will review the regulation and tentatively determine whether the regulation is comparable to or more stringent than this part. If EPA makes a positive tentative determination, EPA will propose an amendment to this rule excluding that State from coverage. Interested persons may comment on the proposed exclusion during the period for public comment. After considering any comments, EPA may promulgate the final amendment to the rule.

§ 763.124 Reporting.

(a) Employers subject to this rule must report to the Regional Asbestos Coordinator for the EPA Region in which the asbestos abatement project is located at least 10 days before they begin any asbestos abatement project, except one that involves less than either 3 linear feet or 3 square feet of friable asbestos material, and an emergency project. Employers must report any emergency project covered by this rule as soon as possible but in no case more than 48 hours after the project begins. A list of the EPA Regional Offices is given under § 1.7(b) of this chapter:

(b) The report must include:

(1) The employer's name and address.

(2) The location, including street address, of the asbestos abatement project.

(3) The scheduled starting and completion dates for the asbestos abatement project.

(c) If a report is mailed to EPA, the report must be postmarked at least 10 days before the asbestos abatement project begins unless the report is for an emergency project. In such a case, the report must be postmarked as soon as possible but in no case more than 48 hours after the project begins.

(d) Employers do not have to report under this section if they submit a notice to EPA under the National Emission Standard for Asbestos, § 61.146 of this chapter, at least 10 days before they begin the asbestos abatement project and that notice clearly indicates that employees covered by this rule will perform some or all of the asbestos abatement work.

(Approved by the Office of Management and Budget under control number 2070–0072)

§ 763.125 Enforcement.

(a) Failure to comply with any provision of this part is a violation of section 15 of the Act (15 U.S.C. 2614).

(b) Failure or refusal to establish and maintain records or to permit access to or copying of records, as required by the Act, is a violation of section 15 of the Act (15 U.S.C. 2614).

(c) Failure or refusal to permit entry or inspection as required by section 11 of the Act (15 U.S.C. 2610) is a violation of section 15 of the Act (15 U.S.C. 2614).

(d) Violators may be subject to the civil and criminal penalties in section 16 of the Act (15 U.S.C. 2615) for each violation.

(e) EPA may seek to enjoin an asbestos abatement project in violation of this part, or take other actions under the authority of section 7 or 17 of the Act (15 U.S.C. 2606 or 2616).

§ 763.126 Inspections.

EPA will conduct inspections under section 11 of the Act (15 U.S.C. 2610) to ensure compliance with this part.

[FR Doc. 87–3645 Filed 2–24–87; 8:45 am]
BILLING CODE 6560–50–M